CAMDEN COASTAL RESILIENCE PLAN

2025

CENTER FOR ENVIRONMENTAL TRANSFORMATION

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CENTER FOR ENVIRONMENTAL TRANSFORMATION

Images from some of CFET's meetings with City Council, community ambassadors, nonprofit leaders and residents.

WHO WE ARE

The Center for Environmental Transformation is an environmental justice organization based in South Camden. We work to empower communities through environmental education and by fostering sustainable, community-driven solutions to local challenges. Many of our board members are long-time residents who have been active in building the social fabric of the city and envisioning its future. We were founded in 2007 by parishioners at Sacred Heart Church to address environmental and social challenges facing the city. Our emphasis has always been on grounded efforts, beginning with urban farming and youth engagement, evolving to take on a larger scale and scope of environmental work over time.

We were awarded a National Coastal Resilience Fund (NCRF) Community Capacity-Building Grant from the National Fish and Wildlife Foundation (NFWF) to support this planning effort, and we are grateful for the opportunity to bring so many partners together to study flooding, to identify places where action could produce the greatest benefit, and to shape specific early action projects and recommendations to increase Camden's resilience.

GRATITUDE FOR OUR PARTNERS

To assist us with this planning effort, the Center for Environmental Transformation (CFET) engaged a public interest consulting team of engineers, landscape architects, planners, ecologists, hydrologists, and policy experts at PennPraxis, eDesign Dynamics, and the Water Center at Penn. Our planning team has over 25 years of experience working with communities and governments to solve resilience problems, and they bring expertise from many past projects, including in Camden.

The strength of this plan rests on the engagement of our phenomenal partners in the process, particularly the members of our Steering Committee and Technical Advisory Panel who met with us often to guide the process and make key decisions. Dr. Edward Williams, Director of the Camden Planning Department, Keith Walker, Director of Public Works, and Joseph Myers, Vice President of Camden Community Partnership represented the City of Camden throughout. Scott Schreiber, Executive Director of the Camden County Municipal Utilities Authority, and his senior planning team worked closely with us. Multiple offices of the New Jersey Department of Environmental Protection supported planning and analysis through the commitment of Frank McLaughlin, Jonathan Miller, Vincent Caliguire, and Candyce Perry.

Our resilience planning process looks at resilience from the perspective of residents, churches, schools, business owners, neighborhood leaders and community-based organizations of all kinds, and we have tried to incorporate their voices in the plan. Throughout the different stages of this process, our community partners and residents helped us map the risks to neighborhoods and to assets, investigate the causes of flooding, and look at the kinds of actions Camden could take to increase resilience.

We are grateful for the advice of people who took time to participate in the meetings that shaped this plan for investment and action.

Jon Compton
Executive Director, Center for Environmental Transformation

SUMMARY


enterprise

VISION FOR THIS RESILIENCE PLAN

This plan outlines a shared set of strategies and priorities for action and investment in Camden to reduce the impacts of flooding on our neighborhoods, to increase community capacity, and to create other economic and quality of life benefits at the same time. Over the last 18 months, the Center for Environmental Transformation worked with community members, community organizations, technical advisors, and policymakers to develop a plan to increase coastal resilience in Camden. The plan is backed by evidence and grounded in neighborhood planning efforts, integrating actions to increase resilience with the plans of neighborhoods and the city.

Flooding is a major and frequent challenge in Camden. Right now, more than 2,800 homes—38% of all homes and apartments—and 43 of Camden's 47 schools are within 50 feet of flood water over 1 foot deep during major storms. That's about 2 out of every 5 homes. More seriously, we estimate that 5% of all homes and apartments in Camden have 2 feet or more of flood water at their doors in severe storms. That's 1 out of every 20 homes. If no action is taken, we estimate that by 2050, roughly 80% of homes and apartments and 72% of industrial and commercial businesses will be within 50 feet of flood water over 1-foot deep in major storms, and 7% will have 2-feet deep or more water at their door or in their basements. **This planning effort studied what is causing the flooding and the best ways to reduce the impact flooding has on our daily lives and property, and on our city's economy and health.** Our team's research shows that the city floods due to heavy rain and snow, storm surges in the rivers, backed up sewers, and their interactions.

Learn more about the flooding analysis on Page 14

Improvements are feasible. And with strategic investment and good design, Camden will be much less vulnerable to flooding as the sea level rises over the next 25 years, and those resilience investments will be the foundation for broader community revitalization.

This planning and capacity-building process was funded by the National Coastal Resilience Fund (NCRF) of the National Fish and Wildlife Foundation (NFWF). **An important part of our planning process has been to develop proposals to funders for concrete early investments in coastal resilience infrastructure that will measurably reduce flooding, strengthen community and economic development, improve public space, and increase wildlife habitat.** These early investments will demonstrate the effectiveness of a model for action that can be replicated in other flood-prone neighborhoods.

We focused the limited time and funding we had on research and action planning to reduce flooding, because it was clear that this challenge was the top priority for Camden residents, the City and the County. We concentrated on nature-based strategies—restoring wetlands and river ecosystems, creating green spaces that store water, and building engineered green infrastructure—to manage and filter millions of gallons of water while also improving public space and streets, quality of life and wildlife habitat. This focus complements work being done by the Camden County Municipal Utilities Authority (CCMUA) and the City of Camden to study and ultimately to increase the capacity of the underground sewer network to reduce the release of untreated sewage into rivers. Our focus on coastal resilience–on water, green infrastructure and habitat–also fits the requirements of our planning grant and key opportunities for funding.

We prioritized the kinds of technical analysis, action planning, project development and cost estimation that are needed to compete for major infrastructure funding to implement projects.

This plan builds on past planning efforts—particularly neighborhood plans and water management initiatives like Camden SMART—and incorporates community insight and experience, and the technical expertise of many advisors and policymakers. Other climate topics such as extreme heat, power grid resilience, emergency response, and threats to specific wildlife species, were beyond our scope and resources. But we looked for ways to reduce flooding that also protect water quality, improve ecological and human health, protect key assets and transportation routes, and increase habitat and neighborhood quality of life. Future resilience planning efforts could study additional topics and develop these dimensions into a comprehensive climate master plan.

Learn more about the past planning efforts in Deep Dive A5

This community-based resilience plan also recommends community priorities for building capacity. Resilience is about more than managing water, greening our infrastructure, and increasing habitat. It is about increasing our capacity to work together to plan and implement projects that make residents, neighborhoods, and the city as a whole stronger and more prepared to handle all kinds of challenges, including flooding and a changing climate. The networks of care, stewardship, learning and problem-solving that hold Camden's neighborhoods together are major assets that can also be strengthened with investment and practice.

Learn more about our ideas for building community capacity on Page 37

Residents and leaders of social and environmental organizations express keen interest in strengthening social networks, communication systems, planning capacity and both individual and collective skill sets. Camden's capacity-building priorities are:

- Job training programs focused on green construction certifications,
- Homeowner resilience program,
- Resilience leadership training program,
- Community-led emergency preparedness, and
- Environmental science education.

For each idea, we highlight exemplary programs that deliver the kinds of capacity-building residents thought were needed the most. Further planning and investments in these social infrastructure programs will increase community strength and preparedness, and create more resilience partners for the City.

FIVE STRATEGIES FOR RESILIENCE IN CAMDEN

Our plan proposes five major strategies for citywide resilience, and recommendations that translate those strategies into actions. The plan combines these strategies in the design of four concrete coastal resilience infrastructure projects and a set of capacity-building priorities of Camden communities.

1 REDUCE FLOODING

Create capacity to store large volumes of rain water in neighborhoods that experience significant flooding, using green infrastructure, floodable public spaces, and sewer improvements

Eliminate sewage back ups in the neighborhoods where they occur and substantially reduce overflows of untreated sewage into rivers, concentrating on major discharge locations

Raise riverbanks and improve floodplains in key locations to protect homes, schools, major transportation routes, businesses and critical infrastructure from river flooding

2 BUILD AND MAINTAIN MULTI-BENEFIT FLOOD RESILIENCE PROJECTS

Design multi-benefit flood resilience projects that also enhance community gathering spaces, recreational opportunities, environmental education, and river access

Design infrastructure that enhances biodiversity, improves water quality, and restores and creates habitat

Integrate and group infrastructure projects to achieve more impact for the money

Support long-term maintenance

3 ALIGN PROJECTS WITH FUNDING SOURCES FOR IMPLEMENTATION

Demonstrate Camden's readiness for and interest in resilience investment

Break large projects into pieces that can be phased and funded by multiple sources and phased if the full price tag is not immediately available

Integrate resilience action with projects that are already in motion, like the development of the LINK Trail network

4 LIFT UP COMMUNITY PLANS AND CAPACITY

Build on past plans and community visions, incorporating rigorous water analysis

Improve neighborhood preparedness and work with community organizations to build capacity

Incorporate community participation, stewardship and environmental education into project design, operation, and maintenance

Expand quality job training programs to increase family resilience

5 INCREASE PRIVATE COLLABORATION TO ACHIEVE RESILIENCE GOALS

Support action by homeowners and landlords to reduce the vulnerability of homes through grants, loans and consulting services

Direct redevelopment to the land parcels that can be made safe from flooding to maximize private investment and build the city's tax and job base

Develop strong standards for climate resilient development

BIG TAKEAWAYS FROM OUR TECHNICAL ANALYSIS

Without action, our analysis shows that climate change and sea level rise will make flooding in Camden much worse. However, if the City, County, and State begin to prepare now, flooding can be significantly reduced.

RAIN AND SEWERS

The main problem is that rain cannot drain easily to the rivers in many neighborhoods of the city. The root of this problem is that past development along the Delaware River and Cooper River filled in wetlands and low areas, and built up waterfronts. Many smaller creeks were redirected or buried in underground pipes so that buildings and streets could be built over them. Stormwater backs up behind these higher filled areas instead of flowing to the rivers.

A second root cause is that most of Camden's sewer pipes, which were designed in the late 1800s and early 1900s, are not big enough to carry the amount of stormwater that is created by extreme rain events. It can take hours, or even days in a very large rainstorm, for the rainwater standing in streets and basements to drain to sewers. To make matters worse, most of our sewers are "combined sewers" that carry both stormwater and sewage. This means that flooding often causes untreated sewage to back up into homes and streets, and to be released in the rivers.

This is happening more often, lasting longer, and the flooding in neighborhoods is getting deeper as a result of climate change and sea level rise. Camden's path to reduced flooding requires two changes: 1) significantly more storage to hold water in safe spaces in flood-prone neighborhoods until low tide (often not more than six or eight hours) and 2) improvements to existing sewer infrastructure to reduce sewer backups and overflows. These changes will keep the water out of homes, streets, schools, businesses and other critical assets, and improve human and ecological health. It will also eliminate sewage backups that regularly occur in a few communities and reduce the amount of untreated sewage that is released into rivers.

In the last 10 years, Camden built over 60 small green infrastructure pilot projects like rain gardens, stormwater planters, permeable pavement, and cisterns through the Camden SMART program. **In the future, water storage needs to be much bigger; it needs to be concentrated in strategic locations with high impact flooding; and it needs to be maintained.** As sea level rises, more pumping systems may be required to actively move water out of neighborhoods when high river levels prevent sewers from getting rain to the rivers.

See the locations and photos of the current conditions of these sites in Deep Dive A6

Map: (Right) Map of historic fill in Camden. The areas shaded in black are areas where wetlands and low areas were filled in for development. (Data source: NJDEP)


Delaware River
BEIDEMAN
COOPER'S POYNT
CRAMER HILL
ROSEDALE
PYNE POINT
DUDLEY
STOCKTON
LANNING SQUARE
MARLTON
WATERFRONT
GATEWAY
BERGEN SQUARE
PARKSIDE
LIBERTY PARK
Cooper River
WHITMAN PARK
CENTERVILLE
WATERFRONT SOUTH
MORGAN VILLAGE
FAIRVIEW
RAIN AND RIVER FLOODING IN 2024
LEGEND
> 1 FEET FLOODING
HISTORIC FILL
COMBINED SEWER OUTFALLS
ELEVATION
26.0 FEET ABOVE MEAN SEA LEVEL
-1.25 FEET BELOW MEAN SEA LEVEL

RIVER FLOODING

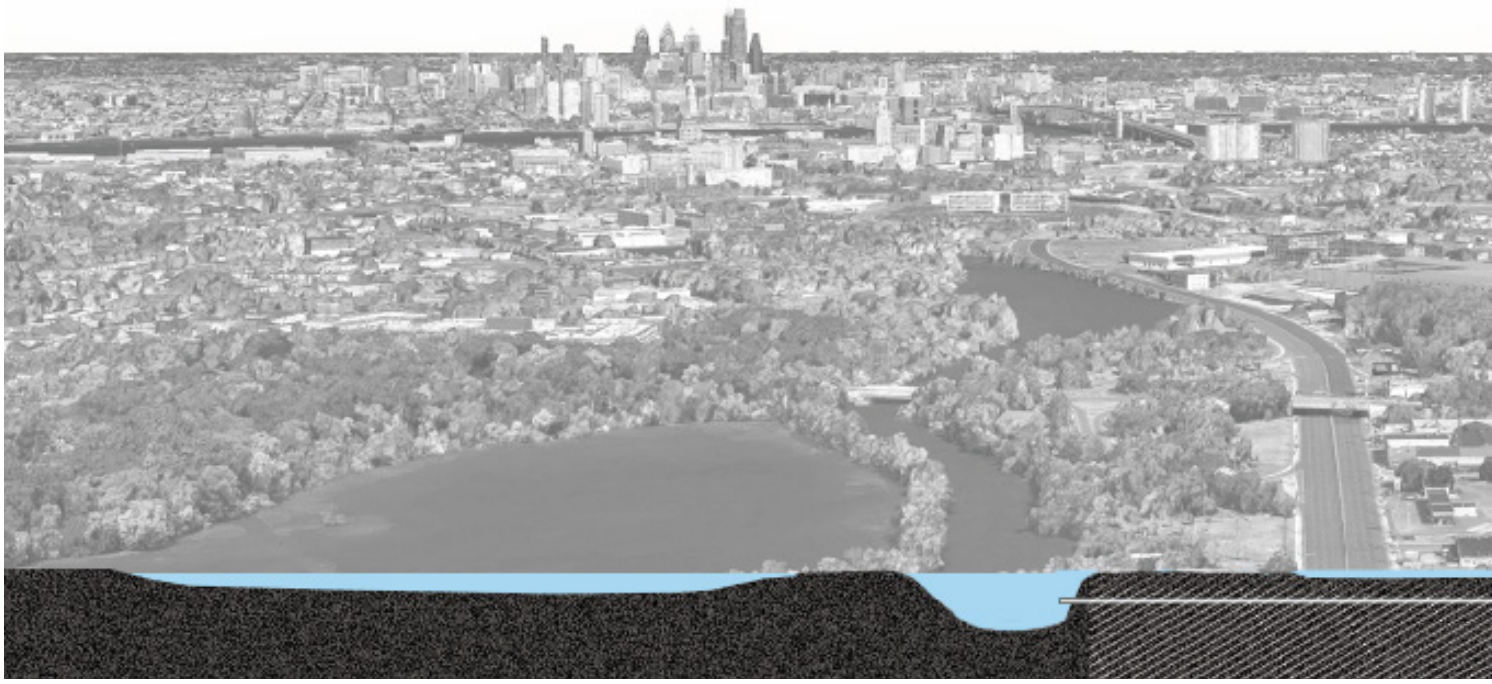
Our research reveals that flooding caused by the Delaware and Cooper Rivers rising above their riverbanks and spreading into the city is currently a problem in relatively few locations: East Camden along Admiral Wilson Boulevard, the Federal Street corridor and in other smaller hotspots.

Learn more about the projected flooding in 2050 on Page 20

As sea level rises, our analysis shows river flooding will spread unless Camden takes action to create flood protection along rivers. To protect the city as sea level rises an estimated 2 feet between now and 2050, river edges will need to be raised in key locations to protect Market Street in Cooper Grant area, Waterfront South and the main sewage treatment plant for Camden County, Cramer Hill, Cooper Grant, and Cooper's Poynt, in addition to East Camden.

In some cases, coastal protection can be provided by preparing flood-prone land for sustainable redevelopment on higher ground that will protect lower inland blocks and manage water. (A good example of this is the former prison site on the Delaware River.) In some cases, raising existing bulkheads will provide protection. (A proposed bulkhead to protect the sewage treatment plant in Waterfront South is an example.) In others, green landscapes that create more room for the river will reduce flooding and offer many other benefits at the same time. (Improvement of Gateway Park, proposed in this plan, is an example of this approach.)

Actions that will reduce the flooding that already disrupts daily life across the city, will also prepare Camden for the challenges from sea level rise in the future. And the projects we recommend in this plan demonstrate how coastal protection that reduces the river flooding can be integrated with measures to reduce stormwater flooding and combined sewer overflows, and with the community's other interests.



STUDYING FLOOD PATTERNS AND RISK TO ASSETS

Precise analysis of flood patterns is needed to determine where Camden can realize the most flood control benefit for the dollar–the biggest bang for the buck. To pinpoint which parts of Camden are at risk of flooding now and in the future, our team developed a computer model that allows us to simulate flood patterns from any combination of rain and tide conditions. We used the model to identify locations in neighborhoods that experienced flooding during the largest recorded storm in recent decades in Camden (which occurred in January 2024), and where wider and deeper flooding would occur in the future. Flow path analysis revealed that major water movement follows historic stream corridors, with the street grid often intersecting with these natural drainage patterns. This creates concentrated flow paths through residential neighborhoods, resulting in high-risk zones.

Learn more about the flood model in Deep Dive A2

Learn more about site selection and risk analysis in Deep Dive A3

Based on the modeling and community asset mapping, we identified eleven distinct flood zones across Camden where water accumulates during storms. For each zone, we studied how water moves during a high-intensity storm now and with 2, 3 and 5 feet of sea-level rise, to identify opportunities for intervention that would protect assets—especially homes, medical facilities, schools and community assets, emergency response, businesses and transportation routes. The team visited and evaluated 19 sites suggested by community members, policymakers and, water infrastructure experts, labeled with numbers in the map on the **next page**. On **pages 24 and 25**, we explain that selection process.

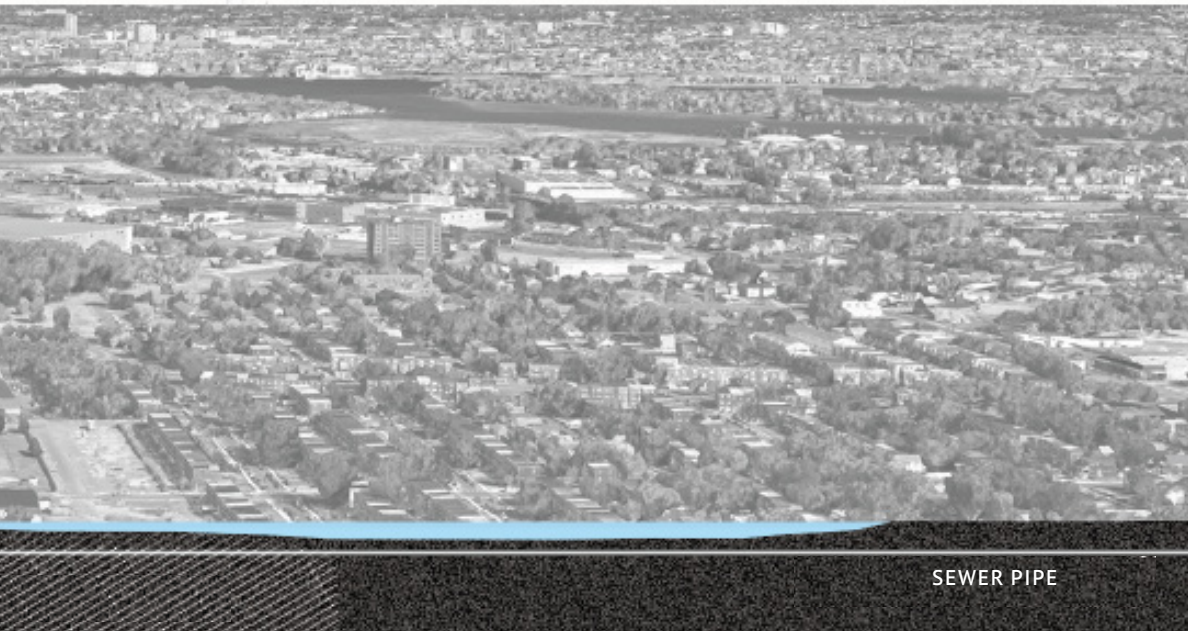
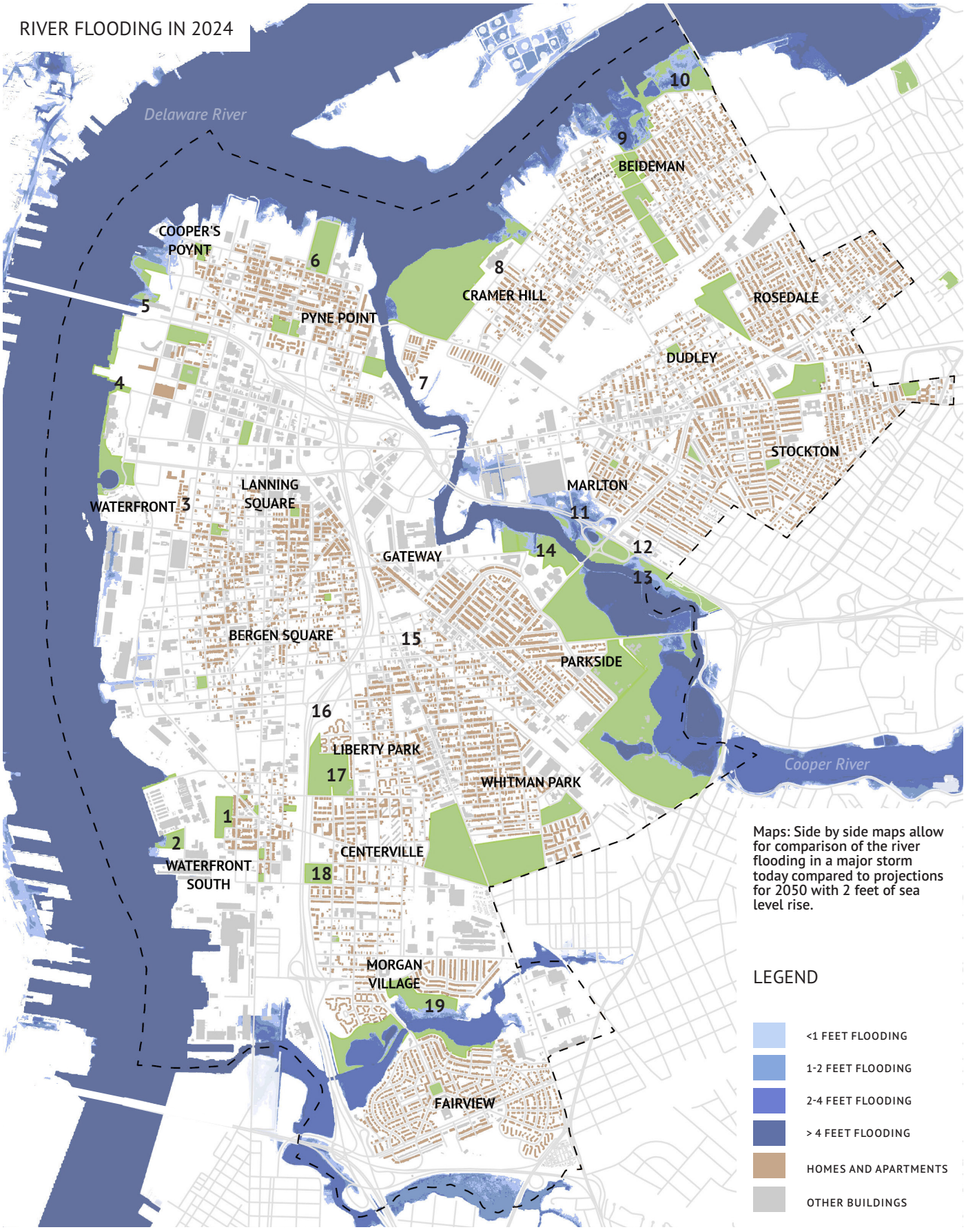


Image 2: The Delaware and Cooper are both tidal rivers directly connected to the ocean. As sea level and storm surges have risen over the last 100 years, the ends of the sewer pipes are underwater more of the time, and unable to release runoff to the rivers until water levels drop. Source



Maps: Side by side maps allow for comparison of the river flooding in a major storm today compared to projections for 2050 with 2 feet of sea level rise.

RIVER FLOODING IN 2050

SITES

1. LINEY DITCH PARK
2. PHOENIX PARK / FORMER MAFCO SITE
3. VACANT LOTS NEAR ROYAL PALM COURT HOUSING
4. MARKET ST NEAR THE VICTOR
5. FORMER PRISON SITE
6. PYNE POYNT PARK / LINK TRAILS NORTH CAMDEN
7. VACANT LOT NEXT TO ABLETT VILLAGE
8. HARRISON AVENUE NEAR KROC CENTER
9. VON NEIDA PARK
10. CAMDEN NATURE PRESERVE
11. VACANT LOTS NORTH OF ADMIRAL WILSON BLVD (NEAR MILLENNIUM SKATE PARK)
12. VACANT LOTS NEAR RANDOLPH AND ADMIRAL WILSON BLVD
13. GATEWAY AND FARNHAM PARK
14. NEW CAMDEN PARK
15. HADDON AVENUE
16. MAURICE PARK (AROUND I-676)
17. JUDGE ROBERT JOHNSON PARK
18. ELIJAH PERRY PARK
19. REV. EVERS PARK

WHAT'S AT RISK IN CAMDEN

Precise analysis of flood patterns is needed to determine where Camden can realize the most flood control benefit for the dollar—the biggest bang for the buck. **This chapter provides additional information about our modeling methods and assets at risk. To pinpoint which parts of Camden are at risk of flooding now and in the future, our team developed a computer model that allows us to simulate flood patterns from any combination of rain and tide conditions.** The model includes the land, creeks, and tributaries on both sides of the Delaware River (including all of Camden) extending from the Burlington Bristol Bridge in the north, to Marcus Hook in the south.

To simulate future water levels we used the latest CMIP6 projections which indicate that by 2050 SLR in the Delaware River could rise by up to 2 feet.

More information on modeling techniques, and our data sources is in Deep Dive A2 and A3

After we initially simulated flood patterns for historical events like Hurricane Sandy, Tropical Storm Isaias, and Hurricane Irene, our Technical Advisory Panel recommended we focus on a more recent event that occurred on January 9 and 10 in 2024 and caused extensive flooding throughout the region. This storm created impassable roads, and caused large areas of Camden to flood. The impact of this storm was significantly worse in Camden than Hurricane Sandy, or any storms in recent times. A very high intensity rain storm dumped a lot of rain in a short time, during a high tide.

Image 3: Photo of flooding during the January 2024 storm.

Photo: Lu Bivona and Tim Feeney, CCMUA

"In my opinion, [the January 9, 2024 storm] speaks to the type of weather that we've been seeing over the past several years, which are these short duration, high intensity events. And if that happens to coincide with high tide, and then in the future, high tide plus two feet [of sea level rise], we're in a world of trouble. Yeah, we're in a world of trouble, you know, maybe by 2050, not 2100."

–SCOTT SCHREIBER, EXECUTIVE DIRECTOR, CAMDEN COUNTY MUNICIPAL UTILITIES AUTHORITY

Once the team validated the model's results against photos taken that day, the model became a tool to identify flood prone sections of the city, under both historical and future conditions simulated by increasing the Delaware River and Cooper River water levels to match sea level rise projections for 2050.

Roughly 5% of all homes and apartments in Camden had knee-deep water (2 feet or more—the depth at which cars become submerged and movement becomes difficult and dangerous) at their doors or in their basements in our simulation of the January 2024 storm—1 out of every 20 homes. Next, we overlaid the worst-case scenario storm with 2 feet of sea level rise. If no action is taken by 2050, with 2 feet of sea level rise, we predict that number could jump to about 7% of all homes—a 25% increase from today's conditions. By 2050, we estimate roughly 80% of homes and apartments will be within 50 feet of flood water of 1 to 2 feet deep during major storms.

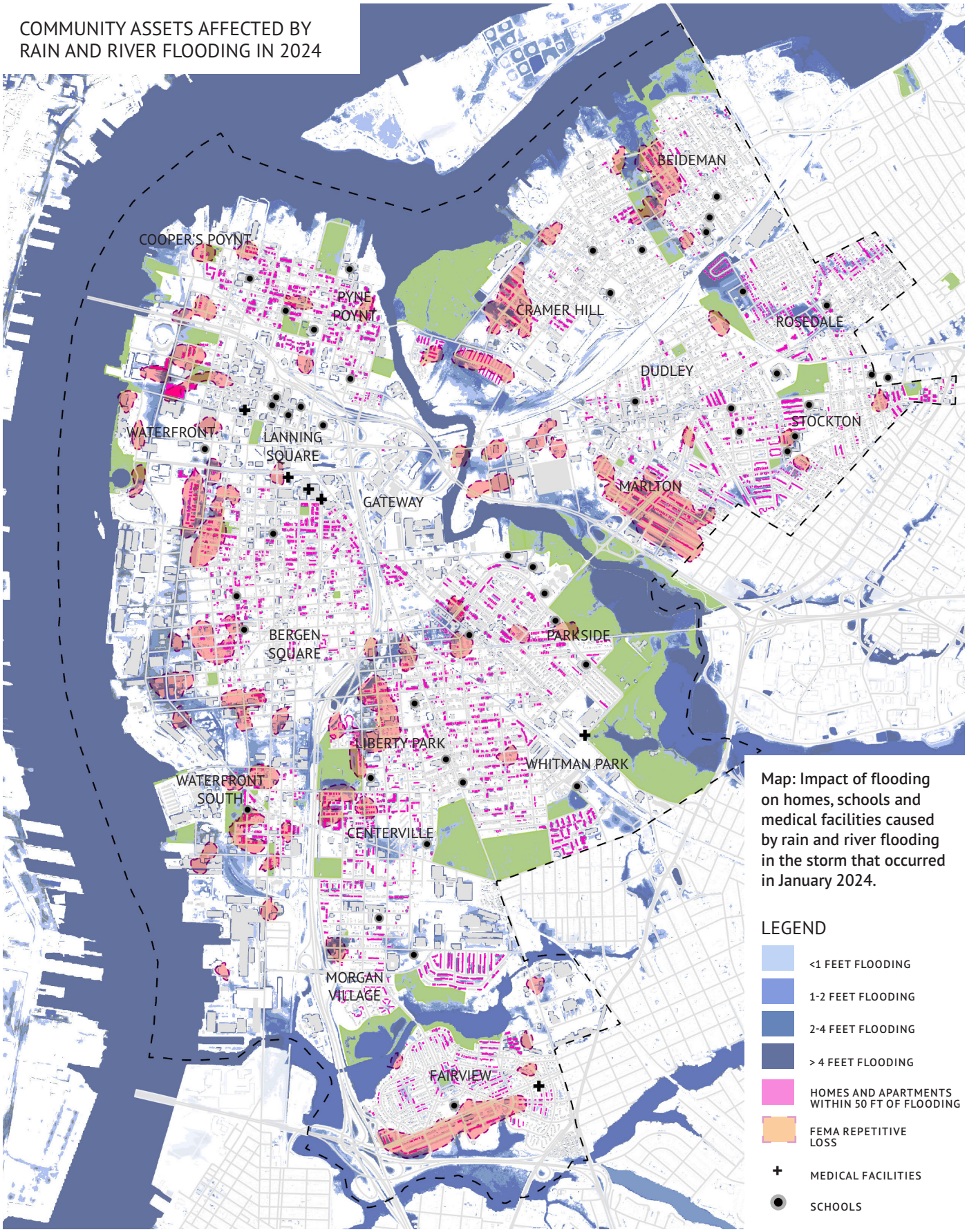
Flooding is also a problem for Camden's businesses. Nearly 75% of all land designated for industrial and commercial use will experience flooding by 2050, which will severely disrupt local businesses, jobs, and the city's tax base. This widespread flooding threatens not just individual livelihoods but the economic foundation of the community. Currently, 222 contaminated locations sit in areas prone to flooding; 26 of these sites are some of the most heavily polluted, requiring major cleanup efforts to address contamination of soil, water, or air. This number is expected to more than double to 69 sites as the sea level rises. When flood waters mix with contaminated soil or materials, they can spread pollutants far beyond their original locations, creating widespread health hazards for Camden residents.

Transportation will also feel the impact of sea level and river rise, with flooding affecting more than 20% of Camden's major roads and arterial streets. **Without action, flood waters will become deeper over time, making travel difficult more often and for longer, isolating different parts of the city.**

Today, 43 out of our 47 schools and 7 out of 10 medical facilities are within 50 feet of at least 1 foot of flood water during major storms like the one in January 2024. Fifteen schools and 4 medical facilities already see deeper flooding.

The Marlton area of East Camden experiences major flooding from the Cooper River, ponding of stormwater, and a concentration of sewer back up locations. The Cooper's Poynt and North Camden waterfront area experiences significant flooding from rain, with fill areas creating barriers to natural drainage. In the Central Business District and Cooper Grant area, there is concentrated river flood risk along the waterfront, compounded by street flooding during heavy rainfall. This area contains key civic and commercial assets exposed to flood risk, and some locations of deep flooding, like Market Street at The Victor building. The Cramer Hill area shows multiple flood pathways coming together around Von Nieda Park, with historic stream beds like Baldwin's Run creating flooded low points that put residential areas and community facilities at risk. In Waterfront South, the combination of river and rain flood risks affects the neighborhood, highly contaminated industrial sites and the County's main sewage treatment plant.

COMMUNITY ASSETS AFFECTED BY RAIN AND RIVER FLOODING IN 2024

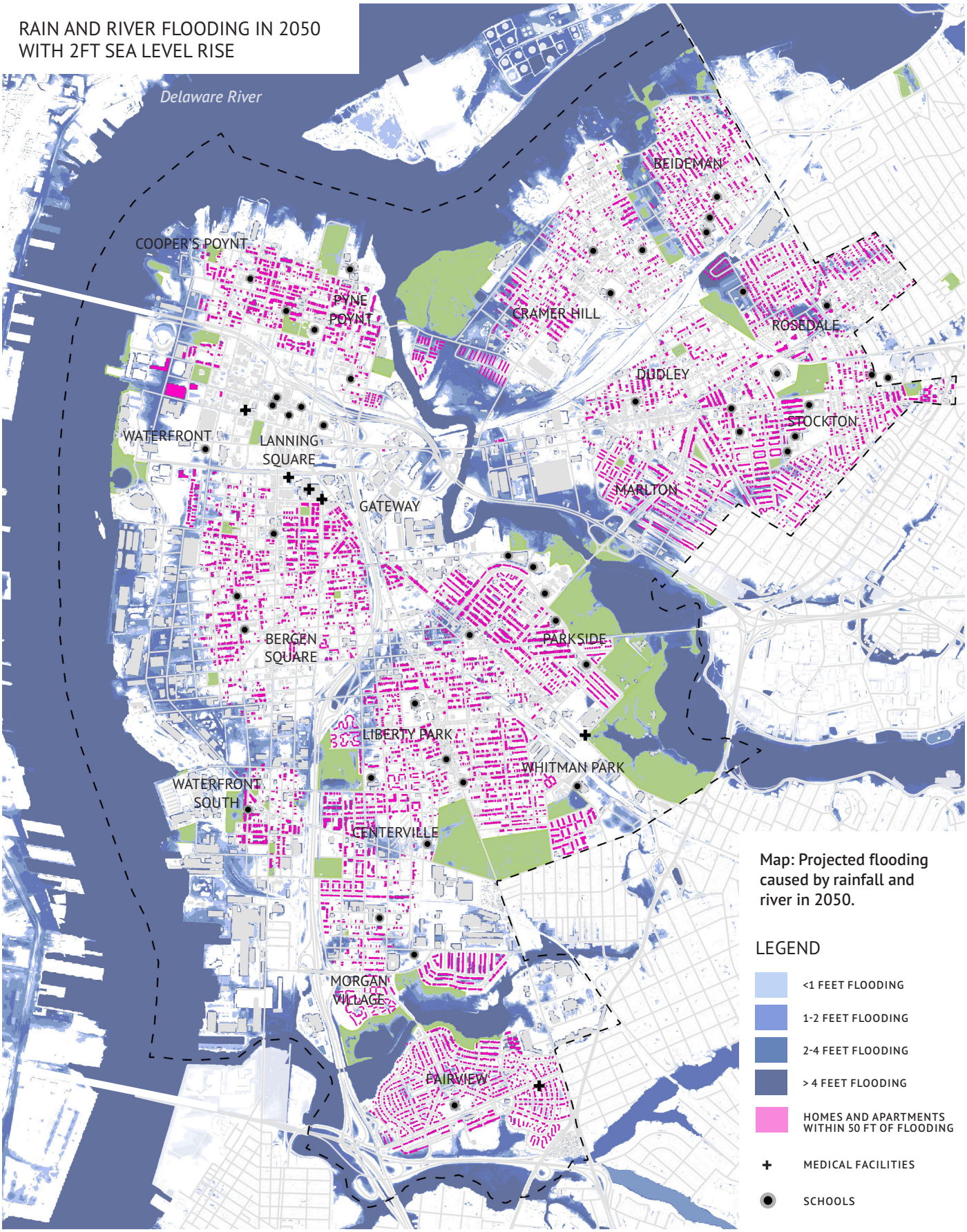


Map: Impact of flooding on homes, schools and medical facilities caused by rain and river flooding in the storm that occurred in January 2024.

LEGEND

- <1 FEET FLOODING
- 1-2 FEET FLOODING
- 2-4 FEET FLOODING
- > 4 FEET FLOODING
- HOMES AND APARTMENTS WITHIN 50 FT OF FLOODING
- FEMA REPETITIVE LOSS
- MEDICAL FACILITIES
- SCHOOLS

RAIN AND RIVER FLOODING IN 2050
WITH 2FT SEA LEVEL RISE



Map: Projected flooding caused by rainfall and river in 2050.

FROM ANALYSIS TO ACTION

This coastal resilience plan proposes strategic infrastructure projects that can be phased and funded by the National Fish and Wildlife Foundation (NFWF), New Jersey Department of Environmental Protection and other government and private foundation sources. The NFWF grant that funded this planning process asked us to propose specific projects for investment, and we agree this is a good way to shift from analysis and planning to action. **To select the best sites for design and implementation of the first coastal resilience projects, the team shared our modeling work in meetings across the city and worked with policymakers and residents to explore possible sites.**

Image 4: The Farnham Park embayment, shown here frozen in winter, still holds strong potential as habitat and a valued community recreation space.

We calculated how much space there was for substantial water storage and whether it would be feasible to divert water flow away from areas with significant flooding. This approach received broad support from our advisors and policymakers. The process of site selection stretched over many months as we adapted to new information from the community and advisors. The locations that received the most serious consideration and field visits are shown on the previous page.

We ruled out sites that were candidates for other improvements. These included sites with drainage infrastructure projects soon to be implemented by CCMUA, for example along Harrison Avenue in Cramer Hill, and sites with designed and funded renovations, like the new football complex coming to Judge Robert Johnson Park. We also ruled out sites where design tailored to a specific future redevelopment will more holistically address flooding perhaps with a higher percentage of private dollars, such as the former prison site and a new housing development near Ablett Village, where the developer plans to build up the site. We ruled out sites where further engineering analysis shows intervention would not relieve much community flooding. For example, while Liney Ditch Park is right next to an area of Waterfront South that floods, we found that adding storage there would barely reduce community flooding. Finally, we ruled out sites where there is no potential for meaningful habitat restoration or where nature-based solutions are not well suited to resolve current or future flooding.

Next, our team worked with residents, policymakers, and advisors to develop a clear statement of criteria for selection of action sites that we could confirm with everyone involved. The National Fish and Wildlife Foundation (NFWF) criteria were one of the four pillars because they provided the grant for our planning work, defined the grant requirements, and are a source of potential funding for the early action projects. During the planning process, we learned that the NFWF criteria aligned well with community priorities. We used the Trust for Public Land's analysis and mapping of priority areas for action on stormwater management and coastal flooding as a check on our own work.

The selection criteria allowed us to compare and rank the sites that had not been ruled out for any of the reasons discussed above. This approach supported our goals of ensuring that investments would go where they could make the greatest difference to long-term flood protection, aligning plans with funding sources, avoiding duplication of effort or competition with planned investments, and designing projects that could build multi-benefit flood resilience infrastructure with ecological and community benefits.

PROJECT CRITERIA

1 NFWF FUNDING CRITERIA

Community Resilience

Green Infrastructure

Wildlife Habitat

Community Impact and Job Creation

Transferability in the Region

2 HIGH IMPACT FLOODING AREAS

Areas with regular flooding causing damage to homes, community assets, and businesses or major interruptions to travel routes

Clusters of buildings with 3+ flood insurance claims in the past 10 years to pinpoint high-intensity shallow flooding zones

3 NEIGHBORHOOD PRIORITIES AND PREVIOUS PLANS

Aligned with neighborhood priorities– creating projects/improving existing projects

Aligned with Camden SMART / Trust for Public Land evaluation of priority areas for stormwater infrastructure and coastal protection investment

Aligned with City, County, State and philanthropic investment priorities

4 POTENTIAL SITES FOR HIGH VOLUME STORAGE

Surface flow patterns to intercept and store water

Vacant/publicly owned land availability

Lower contamination levels (impacting costs, water volume, habitat feasibility)

FOUR COASTAL RESILIENCE INFRASTRUCTURE PROJECTS

After studying flooding, holding meetings across the city, and working with policymakers, this coastal resilience plan proposes four strategic infrastructure projects that are concentrated in the Marlton neighborhood of East Camden. The team designed projects that can be phased and funded by the National Fish and Wildlife Foundation (NFWF), New Jersey Department of Environmental Protection and other government and private foundation sources. **Focusing early investments in a place where big, measurable gains can be made will allow Camden to demonstrate effective action and attract more infrastructure investment for projects in other areas.**

Marlton experiences the greatest flooding impacts and costs, but also presents the biggest opportunities to reduce flooding and, at the same time, create major benefits to health, recreation, transportation, education, water quality, habitat and economic development in the process. The Camden SMART Initiative also identified the Marlton as the highest priority area for both stormwater and coastal infrastructure investment. The decision to concentrate projects in Marlton to achieve "critical mass" also recognizes that projects are in progress that will reduce flooding in other places like Cramer Hill, Ablett Village, Kaighns Avenue, Judge Robert Johnson Park, Lanning Square and Pyne Point Park. Marlton is the place where action is needed next.

The Marlton neighborhood, the Federal Street commercial and industrial district, and Admiral Wilson Boulevard experience heavy impacts from all three kinds of flooding: rain, river flooding, and combined sewer back ups. The neighborhood has the highest concentration of families who have filed three or more flood insurance claims over the past 10 years, and the highest concentration of residents living below the poverty line in Camden. More sewage is released into the Cooper River and on neighborhood streets in this location than anywhere else in Camden.

East Camden is also a place of opportunity. There is plenty of room for flood storage, coastal protection, habitat creation and environmental education in the 25-acre Gateway Park. Marlton has established and effective community organizations. Next to the residential neighborhood, between Federal Street and Admiral Wilson Boulevard, is a commercial and industrial district that will attract much more private investment and job creation when frequent flooding is reduced.

"We want to be strategic. This is why what you've done [with this plan] is so good and so important. Because you focus on areas and projects. Many times to get funding, you need a design concept and a cost estimate. . . [The projects] can go in parallel--they're not competing. There are site remediation, water infrastructure, redevelopment, and natural resource damages funding programs that can support different pieces of a project. I feel good about this approach."

—FRANK MCLAUGHLIN, MANAGER, NJDEP OFFICE OF BROWNFIELD & COMMUNITY REVITALIZATION

Four green infrastructure projects that our team developed with residents, community leaders, policymakers, technical experts, and civic organizations will make a dramatic reduction in the burden of flooding in East Camden:

Concept designs and cost estimates for the projects are on Page 48

1. **Improve Gateway Park and contain flooding along the Cooper River**
2. **Prepare flood-prone land for sustainable redevelopment**
3. **Store and filter Combined Sewer Overflows (CSO)**
4. **Create a high-performance green infrastructure streetscape**

These projects attack the problems, develop the opportunities, and demonstrate the power of the five citywide strategies outlined on Page 12. Together, these projects represent a strategic and cost-effective solution to Camden's biggest coastal resilience challenge when they are paired with upgrades to the sewer system. The total cost is estimated at $107 million, but each project is broken into roughly $10 million components to facilitate faster action, to support phased implementation and to attract support from multiple funders. Some projects are designed to be integrated with investment in the Long-Term Control Plan being developed by CCMUA, or Phase 1 of the LINK Trail, or planned improvements to Gateway Park, or redevelopment of the Federal Street commercial district. Investment in these four transformative projects will:

Our cost-benefit analysis of which projects deliver the most benefit for the money is on Page 69.

Reduce flooding and environmental burdens in East Camden neighborhoods

Reduce flooding on Admiral Wilson Boulevard and promote redevelopment in the neighborhoods and the Federal Street commercial and industrial district

Help the City and County meet the requirements of the Long-Term Control Plan and water management obligations to residents and businesses in a priority trouble spot

Create an active and beautiful central park for Camden that connects people with the Cooper River and links Gateway Park, Farnham Park, New Camden Park, Camden High School and adjacent communities

Improve water quality and wildlife habitat along the Cooper River

Attract more infrastructure investment by demonstrating the effectiveness of an innovative infrastructure model with strong community stewardship.

"This planning process has been extraordinary. Narrowing down the sites using this process has been really top notch planning. I am very pleased with where we are headed."

–SCOTT SCHREIBER, EXECUTIVE DIRECTOR, CAMDEN COUNTY MUNICIPAL UTILITIES AUTHORITY

THE PLAN


COMMUNITY REVIEW
AND DISCUSSION OF
DRAFT MASTER PLAN
REVISIÓN Y DISCUSIÓN
COMUNITARIA DEL BORRADOR
DEL PLAN MAESTRO


REDUCE FLOODING
5 INCREASE PHYSICAL ACTION

01 OUR COMMUNITY-BASED PLANNING PROCESS

Camden residents have deep knowledge about flooding patterns, infrastructure failures, and community needs—knowledge that proves essential to understanding both the problems and potential strategies that could work in the city. **Our planning method combined technical analysis with community engagement to ensure solutions are both technically sound and community-supported.** The process began by interviewing many stakeholders, mapping risks to neighborhoods and community assets, studying flood causes, and evaluating potential project sites with support from community members and City, County and State policymakers and other advisors.

Three key groups guided the process: residents and community leaders, a Technical Advisory Panel of experts and policymakers that met with us quarterly to offer technical expertise, and a Steering Committee with representatives from communities, government, and non-profit organizations that shaped the direction of the plan, the selection of the most promising sites for early action, and the design of the projects.

The technical groundwork provided the foundation for community conversations in four focus groups in flood-prone neighborhoods, open houses at the Center for Environmental Transformation (CFET), a visioning workshop in East Camden, and a public meeting to share and revise the draft designs and recommendations.

CFET's nine community ambassadors from different neighborhoods led outreach efforts and facilitated community meetings, bringing local knowledge and trusted relationships to the process. These ambassadors proved essential not just for organizing well-attended meetings but for interpreting community priorities and continuing conversations in the neighborhoods after meetings to deepen the input and problem-solving.

A tour of all of the existing green infrastructure in Camden helped us understand maintenance challenges and lessons from past projects. Camden residents in CFET's Environmental Justice Taskforce traveled to see successful floodable parks and green infrastructure in other cities to learn about what's working elsewhere.

CFET tabled at community events throughout the year, from the Waterfront South Neighborhood Block Party to La Ingrata's Dia de los Muertos, to talk to residents who might not attend a formal planning meeting but had valuable insights to share. These conversations confirmed that flood concerns were widespread and top of mind across Camden, but each area had distinct patterns and priorities shaped by local geography, infrastructure, and community assets.

Image 5: From top to bottom, left to right: Open house at CFET where we invited the community to learn more about the resilience plan and invited open input on sites to consider; CFET community ambassadors-Kevin Barfield, Maritza Guiridy and Frank Santos; Focus group in Central Waterfront; Seeking input from Camden residents at La Ingrata's Dia de los Muertos; Open house at CFET; Site visits with community leaders and organizations — pictured here are Olivia Glenn, Rashida Okezie and Ellen Neises.


EXIT


BEIDEMAN
COOPER'S POINT
CRAMER HILL
ROSEDALE
DUDLEY


CENTER FOR


EXIT

FOCUS GROUP IN WATERFRONT SOUTH

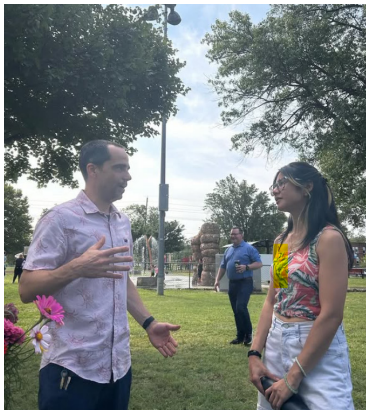
LA INGRATA'S DIA DE LOS MUERTOS

FOCUS GROUP IN COOPER GRANT

SITE VISITS ACROSS CAMDEN

FOCUS GROUP IN EAST CAMDEN

CFET EJ GROUP VISITS RESILIENCE PROJECTS IN NEW YORK



CFET AT AMERICAN WATERFEST

WATERFRONT SOUTH BLOCK PARTY

FOCUS GROUP IN EAST CAMDEN

07/24 08/24 09/24 10/24 11/24 12/24 01

STAKEHOLDER INTERVIEWS

See full list of stakeholders interviewed in Deep Dive A1

MEETING WITH TECHNICAL ADVISORY PANEL

MEETING WITH CCMUA TO DISCUSS NEW MODELING RESULTS

GREEN INFRASTRUCTURE REALITY TOUR

MEETING WITH LISA SIMMS AT NJ TREE FOUNDATION TO DISCUSS GREEN STREETS

MEETING WITH CCMUA TO DISCUSS MAINTENANCE OF CAMDEN SMART

MEETING WITH CCP TO DISCUSS CITY-WIDE PARK MAINTENANCE

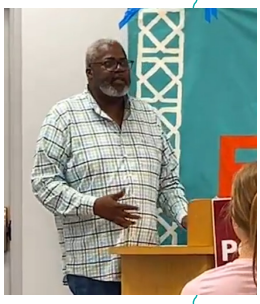
MEETING WITH TECHNICAL ADVISORY PANEL

COMMUNITY DESIGN WORKSHOP AND DISCUSSION

EAST CAMDEN COMMUNITY MEETING

SITE VISITS

SITE VISITS WITH NJCF AND OLIVIA GLENN



CFET OPEN HOUSE WHERE WE ASKED FOR INPUT ON SITES WE WERE CONSIDERING

CFET EJ GROUP VISITS RESILIENCE PROJECTS IN BALTIMORE

CAMDEN CLIMATE TOWN HALL

1/25 02/25 03/25 04/25 05/25 06/25 07/25

MEETING WITH TPL

MEETING WITH CITY'S PLANNING AND PUBLIC WORKS DIRECTORS

STEERING COMMITTEE MEETING

MEETING WITH AMERICAN LITTORAL SOCIETY TO DISCUSS WETLAND PROJECTS

MEETING WITH LINK TRAILS TEAM

MEETING WITH TECHNICAL ADVISORY PANEL

STEERING COMMITTEE MEETING

MEETING WITH TECHNICAL ADVISORY PANEL

MEETING WITH COUNTY PARKS DEPARTMENT

STEERING COMMITTEE MEETING

CFET PRESENTED THE TOP TAKEAWAYS TO THE CITY COUNCIL

MEETING WITH NJCF WHO CREATED THE 2018 GATEWAY PARK PLAN

02 WHAT WE HEARD FROM RESIDENTS

This chapter summarizes the major findings of the community engagement process that shaped our plan's five strategies for citywide resilience, the concept design for the infrastructure projects, and the capacity-building recommendations aimed at increasing economic and social resilience. It also documents some of the ways we responded to community concerns in the planning process.

REDUCE FLOODING THROUGH MULTI-BENEFIT INFRASTRUCTURE

Flooding is the top community concern but, from the beginning, a clear community vision emerged for infrastructure that serves multiple purposes beyond flood management. The kinds of resilience projects traditionally supported by the National Fish and Wildlife Foundation—living shorelines and habitat restoration in public spaces—are by definition, multi-benefit investments. Many residents were enthusiastic about creating habitat for birds, fish, and other wildlife, and providing water access for fishing, kayaking and environmental education programming. Expanding Camden's tree canopy, reducing urban heat, and improving air quality are valued benefits of the nature-based approach to flood reduction. Community members appreciate the concept of a programmed floodable park and were excited about many of the park examples our team shared or that they visited in Baltimore and New York as part of our planning process. **Residents are also interested in storing water under new playgrounds and basketball courts. In a city of limited resources, it makes sense to people that every investment has to do more than one thing.**

ALIGN PLANS WITH COMMUNITY VISION

Felix Moulier from St. Joseph's Carpenter Society captured a widespread community sentiment: "**The population is frustrated by lots of plans not becoming a reality.**" This frustration was echoed throughout the engagement process, as residents shared experiences of previous planning efforts that never brought tangible improvements.

At a time when municipal funding is very limited and federal funding programs may be changing, we sought advice from the plan's advisors on the best ways to align this plan with as many potential sources as possible. **City policymakers let us know early on that stimulus for development was an important consideration. Not all vacant public land could be turned into parks that store water.** We focused on projects that helped solve problems of importance both to community members and policymakers—for example, priorities and key sites of the Long-Term Control Plan—and projects where matching money was most likely to be available. **We developed strategies to promote private partnership in water management, as well as individual initiative to make buildings more resilient.**

Beyond funding limitations, residents identified two systemic issues: lack of coordination between different planning efforts and insufficient community involvement when projects do move into implementation phases. To address this issue, our plan builds on the analysis and specific proposals of many previous plans, particularly the ones that were developed through patient community engagement.

For example, as our team began to consider infrastructure projects in East Camden, Kevin Barfield, a long-time resident who later became a CFET ambassador, sent us three past plans he wanted us to review closely to see if we could align this plan with long-standing neighborhood plans and dreams: "A long time ago, Farnham Park had trails from Baird Boulevard, and you could walk down to the banks of the Cooper River, families picnicked and played at the river." Kevin pointed us to the 2017 Cooper River Park West Plan which envisions an actively programmed "central park" for the whole city on both sides of the Cooper River, linking Gateway Park, and Farnham Park.

Next we met with Justin Dennis at the Trust for Public Land (TPL) to review the 2018 plan for improvement of Gateway Park to understand how our work could push implementation of that plan forward. We met with Jack Swaroski to discuss the status of plans for Phase 1 of the LINK Trail through East Camden. Then we met with community members who told us Gateway Park needed much more active programming and facilities than the 2018 plan called for, so we developed projects that integrate new park facilities like play areas and basketball courts with water storage. We incorporated these into an update to the Gateway Park plan that respects the design approach that planners had taken before us. We have been developing the proposed resilience update to Gateway Park with residents, Camden County Parks, NJ Conservation Foundation, TPL, CCMUA, NJDEP, Camden City Council, the Camden Department of Planning and Development.

The collaboration and relationships we built between communities, government, potential funders and many different non-profit organizations helped us to create the strong, broad-based foundation needed for successful implementation. **Because the recommendations and projects of this plan integrate past planning efforts, and the concerns and advice of government agencies, it has more bases of institutional support needed to move from planning to action than many other planning efforts.**

Learn more about the past plans we studied and built on in Deep Dive A5.

MAINTAIN THE INFRASTRUCTURE WE BUILD

Community members do not see many of the weedy, poorly maintained rain gardens built as part of the Camden SMART program as an asset or amenity in their neighborhoods. Community members consistently emphasized that maintenance is not just a technical issue but a community concern. During discussions about existing green infrastructure pilot projects, residents pointed out misalignments between infrastructure placement and actual flooding. One Waterfront South resident observed, "It floods on our street, but they put the rain garden on Broadway a block away where it doesn't really flood. Could they just extend that to where the rain actually does flood?"

A comprehensive tour of Camden's existing green infrastructure sites, conducted by CFET with CCMUA staff, revealed that without proper maintenance, even well-designed green infrastructure quickly deteriorates and loses both its function and value to the community. The original plantings have not survived in many rain gardens that were once beautiful. Many sites are identifiable as rain gardens only by the Camden SMART sign.

Nate Echevarria, former director of the Camden Special Services District, spoke about the challenge of his organization's contract with CCMUA to maintain the rain gardens: "The problem is that our guys are 'eradicators' with mowers, not gardeners. They don't know how to care for this kind of planting."

Image 6: Youth leaders are an important part of Camden's green and resilient future — helping reimagine, care for, and advocate for well-maintained rain gardens that truly serve their neighborhoods. Source: CFET

SUPPORT COMMUNITY STEWARDSHIP AND LOCAL JOBS

The community believes that successful performance requires realistic, local stewardship going forward. New infrastructure must be designed with maintenance in mind. **Many community organizations expressed willingness to participate in stewardship but stressed the need for economic support and institutional coordination.** Green infrastructure stewardship models led by community organizations would be viable in many neighborhoods. The Bronx River Alliance is an example of an effective community organization that the City of New York contracts with to provide training, maintenance jobs and supervision, supported volunteer events, and stewardship of diverse green infrastructure assets, while also building community capacity. This model could support neighborhood collaboration of elder gardeners and younger people, each earning some money for their part-time work.

CFET and other environmental organizations—many of which have been involved in urban farming and environmental education for decades—are ready to build a stewardship framework for ongoing community involvement that builds on existing organizational capacity and creates opportunities for residents to develop skills and leadership in resilience projects. Grants and government contracts could support the development of a robust and cost-effective stewardship program for the projects proposed in this plan.

"If residents have training in [stormwater] management or park maintenance, it's like giving us tools to keep this work going ourselves. People are invested here, and if they're trained and given the support, it would make these projects stronger and more successful. We want to be part of the solutions."

–KEVIN BARFIELD, COMMUNITY LEADER, CAMDEN RESIDENT

A key part of the framework is funding for at least one professional gardener with a permanent position to support community stewards and maintenance crews. The community-led stewardship framework would create maintenance guides, training, schedules, a structure for volunteers, and educational programming that leverages all of the know-how in Camden's community organizations. In time, we could serve additional rain gardens, stream restorations and streetscape projects.

LIFT UP COMMUNITY CAPACITY FOR RESILIENCE

In community meetings, we heard from many people that a resilience plan has to go beyond water management, and include workable strategies that also increase our capacity to work together to plan and implement projects that make residents, neighborhoods, and the city as a whole stronger. The community's emphasis on jobs and training as personal and community resilience infrastructure was a central theme. Umar Adeyo, a CFET board member from Cooper Grant, stated directly, "At the top of my list is going to be jobs and training."

We translated these conversations into recommendations for investment in five kinds capacity-building programs outlined in the next section of this chapter:

- **Job training programs focused on green construction certifications,**
- **Homeowner resilience program,**
- **Resilience leadership training program,**
- **Community-led emergency preparedness, and**
- **Environmental science education.**

Image 7: Home preservation workshop led by PennPraxis.

Image 8: Energy Coordinating Agency (ECA) training program in Philadelphia offers 12 industry credentials. Source: ECA

JOB TRAINING PROGRAMS

Jobs are widely considered the most important piece of personal and family resilience infrastructure. The successful model developed by Philadelphia's Energy Coordinating Agency (ECA) offers an aspirational blueprint for Camden. ECA's green workforce training provides pathways to family-sustaining careers for 250+ students each year at no cost to participants. The green careers training focuses on "critically at-risk" young adults ages 18-25 and achieves an 85%+ job placement rate. Many graduates are women who see technical careers as a rewarding and flexible alternative to low-paid service work. A significant proportion of graduates eventually start their own businesses.

ECA's 12 industry credentials are delivered through IREC-accredited programs in solar installation, HVAC systems including energy-efficient heat pump systems, green infrastructure construction and maintenance, environmental remediation, and energy efficiency retrofits, all under one roof. The program provides hands-on training, apprenticeship, and 3 tiers of industry-recognized certifications. Similar to the model used by Hopeworks in Camden, which provides computer skills training and in-house apprenticeship, ECA also runs a contracting business that employs graduates who are certified but still novices. For example, ECA holds emergency heating and cooling service contracts for help hotlines operated by several municipalities, which create opportunities for students to learn on the job with the support of ECA teachers.

A number of public and private funders support training programs that concentrate on building a workforce for climate mitigation and resilience. In 2024, the National Oceanic and Atmospheric Administration's Climate-Ready Workforce initiative provided $50 million in funding to nine projects across the US that provide training for such jobs. For example, the City of Boston was awarded $9.8 million to create the Greater Boston Climate and Coastal Resilience Workforce Alliance. This initiative will create 1,200 jobs in climate resilience occupations over 4 years. The Alliance will prepare workers for installation of flood protection infrastructure, maintenance of water and wastewater systems, emergency response roles, and community education and outreach.

Image 9: Philadelphia's Rebuilding Together volunteers repair and weatherize homes in Philadelphia. The program provides critical home repairs, energy-efficiency upgrades, and accessibility improvements for low-income residents, helping families stay safe, reduce energy burdens, and strengthen long-term housing resilience. Source: Rebuilding Together

HOMEOWNER RESILIENCE AND LOAN PROGRAM

Community members are inspired by homeowner resilience programs that combine grants and low-interest loans to help residents to waterproof their basements, elevate heaters and other utilities, install backup power systems, and to weatherize their homes with improved insulation, windows, energy-efficient appliances, HVAC and solar panel upgrades. These measures reduce climate vulnerability, household energy burdens, and deterioration of housing stock. The program could serve low- and moderate-income homeowners with blended financing that makes major home improvements affordable.

The Home Repair Program run by St. Joseph's Carpenter Society already provides the foundation for expansion of services for Camden area residents, with established networks of contractors and energy auditors, administrative systems and oversight that supports repairs for 100 to 120 homes per year in the area. Additional investment in the program would allow St. Joseph's contractors to add new climate adaptation components to support upgrades to more homes. Support for block and neighborhood-scale design and retrofit strategies based on our water modeling would help families and contractors better assess and adapt to the site-specific risks that each home faces.

New York's Resilient Retrofits Program is an example of a comprehensive homeowner resilience model, combining flood-proofing with energy efficiency through a proven 50% grant, 50% low-interest loan structure. With 200+ homeowners approved and 60+ homes completed since 2023, the program demonstrates how blended financing makes major home improvements affordable. The program's average $25,000-$40,000 project costs achieve 20-30% energy savings and significant flood protection. ECA operates a similar subsidized weatherization and resilience program for homeowners. Other programs support DIY efforts with clinics and advisors who make house calls.

"Homeowner repair, resilience and weatherization programs don't just fix a problem; they build skills and support families who are committed to Camden. It's a long-term investment in the community, not just a quick fix."

– JOSIE OCASIO, CRAMER HILL COMMUNITY LEADER AND CFET AMBASSADOR

Image 10: Philly Thrive organizes residents through resilience leadership circles that build skills, confidence, and community power to advance clean air, environmental justice, and neighborhood resilience. Source: PhillyThrive

RESILIENCE LEADERSHIP TRAINING PROGRAM

Camden's resilience will be strongest when residents are involved and organized to lead the charge on the kinds of projects that are best run by community organizations. **Camden residents we spoke with are interested in a resilience leadership network that provides training, mentorship, and small grants for community-led projects.**

Philly Thrive is a Philadelphia grassroots organization that has built a network of member-leaders who fight for clean air, environmental clean up, youth development, green space improvements, job training, home repair programs and other measures to increase residents' ability to stay in their own homes and to thrive. Philly Thrive has developed a series of highly effective leadership circles that hold teach-ins to help residents master technical content (such as remediation techniques) and problem-solve together so they can effectively participate in public processes and lead a series of increasingly diverse programs that support their community. Philly Thrive provides peer and elder support to grow confidence and skills. During COVID, Thrive organized a successful drive to collect donated smartphones, tablets and laptops, wipe and prepare them for new users, and then train people to use them. This allowed the entire community to participate in virtual meetings, stay connected and receive care at home throughout the pandemic.

The Bronx River Alliance is an example of an organization that has successfully trained many informed and active residents to participate in education and stewardship programs that helped reclaim a neglected urban waterway. Crucially, they forged a governance structure that brings residents, nonprofits, businesses, and city agencies together as partners, backed by a mix of federal grants, philanthropic gifts, and municipal contracts for maintenance of what is now a vibrant and very well-funded greenway.

"The community has people who can really make a difference, especially bilingual leaders. We should have people who know the area leading projects. If there's training involved, we could create a whole group of people ready to take care of Camden's needs. It's not just the city coming in to fix things--it's us building Camden together."

-SHIRLEY IRIZARRY, PYNE POYNT RESIDENT AND CFET OUTREACH COORDINATOR

Image 11: LES Ready! flood protection barriers and alarms distribution event. Source: LES Ready - Long Term Recovery Group Facebook page.

COMMUNITY-LED EMERGENCY PREPAREDNESS

Camden residents would like to learn more about what it takes to create a community-led emergency preparedness network that coordinates disaster response while building long-term preparedness capacity. Participants in our meetings were particularly interested in the coalition model LES Ready! developed in the Lower East Side, a largely Latino community of Manhattan at the time of Hurricane Sandy in 2012. The storm caused significant damage to residential buildings and left most of Manhattan without power and water. Government agencies were slow to respond. Residents relied on existing social networks and community organizations like Good Ol' Lower East Side (GOLES), University Settlement, Henry Street Settlement, and Grand Street Settlement and the idea for a preparedness coalition was launched.

LES Ready! now organizes 70+ community organizations into a sustained coalition that coordinates disaster response while building long-term resilience and collaboration. They created a comprehensive, neighborhood emergency plan that focuses on the needs of their diverse community, covering communications, evacuation support, and medicine, water and food distribution. The plan is visual, multilingual, and free of jargon so ordinary residents, small businesses and organizations can actually use it in a crisis. The coalition meets regularly and runs preparedness and drills. Member organizations each bring their strengths—from churches to tenant groups to environmental and cultural nonprofits—and agree on roles so that when disaster strikes, everyone knows what to do.

Over the last decade, LES Ready! has received significant funding to support their efforts with paid staff positions. The coalition has become an effective advocate for hundreds of millions of dollars in Federal, State, and City investment in flood protection parks. Trained members provide feedback on all City-led resilience projects. The coalition structure coordinates organizational capacity and builds a collective while preserving the autonomy of individual organizations—an appealing model for Camden.

"We all want to be part of this and make Camden better. If we can do work in our own neighborhoods . . . it's going to help everyone, not just with flooding but also by giving people a reason to stay here and feel proud."

—BART WILLIAMS, CRAMER HILL RESIDENT

Image 12: Urban Promise and Upstream Alliance STEM programs on the Cooper River that engage youth in science, boating, and environmental stewardship, building the next generation of community leaders. Source: Urban Promise

ENVIRONMENTAL SCIENCE EDUCATION

Many of the participants in our planning meetings were teachers or retired teachers, so it is not surprising that science education and learning experiences for children, youth and adults came up as a strategy for building community capacity to plan for climate adaptation. A number of local and regional environmental organizations have rich offerings that could be expanded with additional resources and partnerships. For example, Urban Promise has been providing youth environmental education in supportive settings and on-water experiences for more than 30 years. The organization's programs include both afterschool and summer activities that get young people interacting with the waterways in Camden. Through boat building, boating and water quality monitoring, Urban Promise expands students' experience with STEM topics and their knowledge of their surroundings.

Construction of a kayak and canoe launch at Gateway Park will begin this year. The dock will allow Urban Promise boats to get people on the Cooper River in a new and calm location that serves East Camden and Parkside, and local schools including Thomas Dudley Elementary in Marlton and Camden High School. **A community vision for an environmental education center at Gateway Park is shared by the Center for Environmental Transformation, Urban Promise and other environmental groups as a hub for innovative and inclusive environmental science education as well as the stewardship approach we outline earlier in this chapter.** Programming will engage students in community science projects, including water quality monitoring in the Cooper River, air quality assessment near industrial facilities, and urban ecology research in Gateway Park and other green spaces. **Students will work alongside community members to document environmental conditions, enjoy activities along the Cooper River and implement community-driven solutions like rain gardens and habitat restoration projects.**

Image 13 and 14: STEM programming and kayaking on newly opened Cooper River Water Trail. Source: Upstream Alliance

03 FOUR COASTAL RESILIENCE INFRASTRUCTURE PROJECTS

This plan concentrates multiple resilience projects in one neighborhood to achieve a large and measurable impact on flooding and other community resilience outcomes—something earlier green infrastructure efforts in Camden did not accomplish. While Marlton faces some of the most severe flooding challenges in all of Camden, it also holds the greatest potential for transformative improvement due to its community capacity and its proximity to the 25-acre Gateway Park, the Cooper River, the future LINK Trail, other underutilized public land, and Admiral Wilson Boulevard (Route 30), an eight-lane transportation route of regional significance.

Marlton's flood resilience needs are significant. It floods when urban runoff is prevented from draining to the river by high tide, when the Cooper River occasionally overflows its banks, and when the sewers overflow. The Marlton neighborhood is one of the most economically challenged areas in Camden with a poverty rate that falls in the 31-45% range. **Marlton contains the largest cluster of homes in Camden with three or more flood-insurance claims in the last 10 years, according to FEMA data.** More than half of the properties in Marlton are within the FEMA 100-year floodplain (a larger percentage than any other census tract in Camden).

Gateway Park contains the two largest combined sewer overflows on the Cooper River, which collectively release 56.6 million gallons of untreated sewage during an average year. In fact, Gateway Park is not yet officially a park. It is owned by CCMUA and managed by the New Jersey Conservation Foundation, rather than the Camden County Parks Department, because when Gateway was created in 2002, policymakers were aware that water infrastructure would need to be sited there to solve local flood and CSO problems, and improve water quality in the Cooper River.

"This area has a big bull's eye on it because we know from the Long-Term Control Plan that the Cooper River and this neighborhood in East Camden need to be addressed in some way...This is probably exactly where we were going to have to build some sort of satellite treatment facility to fix the combined sewer back ups and overflow problems."

—SCOTT SCHREIBER, EXECUTIVE DIRECTOR, CAMDEN COUNTY MUNICIPAL UTILITIES AUTHORITY

"East Camden has been last in priority for redevelopment, and I hadn't realized how many flooding and CSO issues the East Camden community has been dealing with. It's good to see now that this particular area is on the radar, and there are solutions."

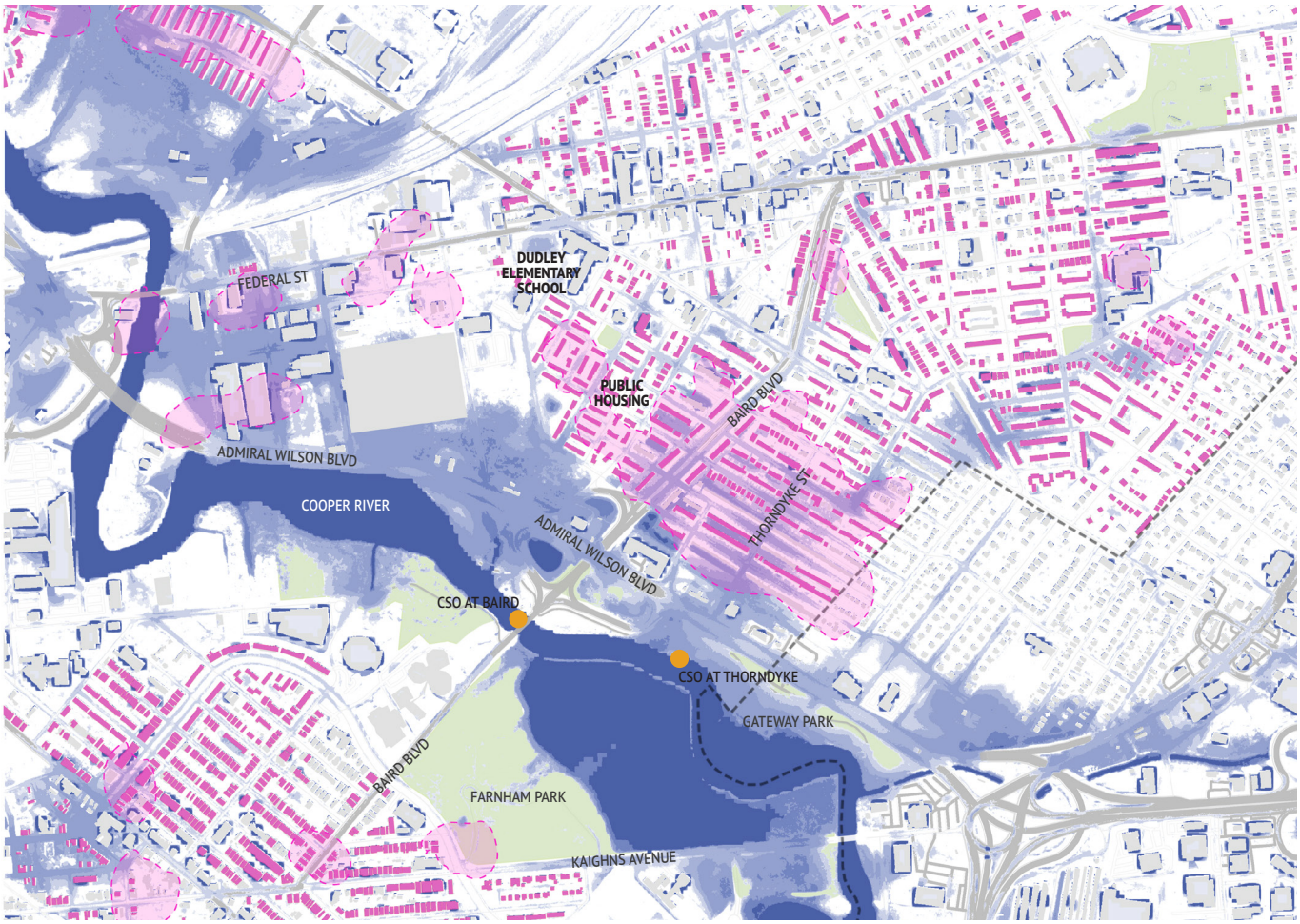
-KEVIN BARFIELD, EAST CAMDEN RESIDENT AND COMMUNITY LEADER

Immediately west of the Marlton neighborhood is the Federal Street business district, with many publicly owned parcels that present opportunities for redevelopment. Business operations and the Thomas Dudley Elementary School are routinely affected by flooding, and Admiral Wilson Boulevard is often impassable during storms.

Community members are frustrated. They prioritized flood reduction in the 2021 My East Camden neighborhood plan but feel the area has been neglected while investment in infrastructure has gone to other neighborhoods. People want relief from the flooding that disrupts their daily lives, makes it difficult to get to work or to school, and makes it unhealthy for children to play outside for days after rainfall. But residents also have a broader vision for their neighborhood that goes well beyond managing water.

When our team shared the engineering analysis with East Camden and Parkside community leaders, they were excited because the findings align with their vision and long-term planning and advocacy efforts to create more programming in Gateway Park. The four infrastructure projects incorporate this vision into flood solutions.

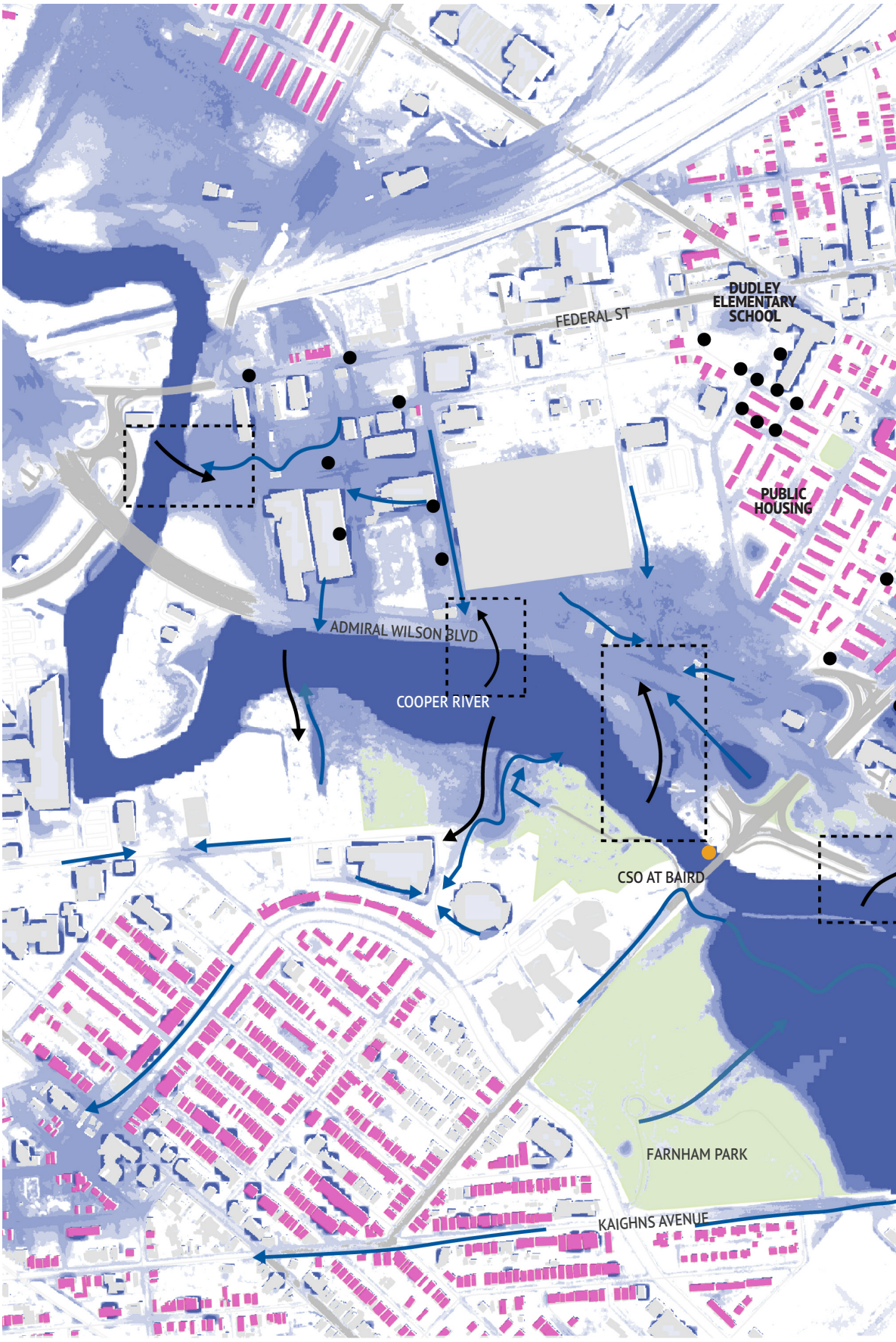
Map: This map of the Marlton, East Camden shows high impact flooding in the neighborhood during the January 2024 peak storm we used to model flood patterns.



Map: This map shows flooding that occurred in Marlton during the peak storm we used to model flood patterns. (See Page 39 for additional information)

It also adds the direction of stormwater flow paths with blue arrows, and the locations where the Cooper River floods with black arrows.

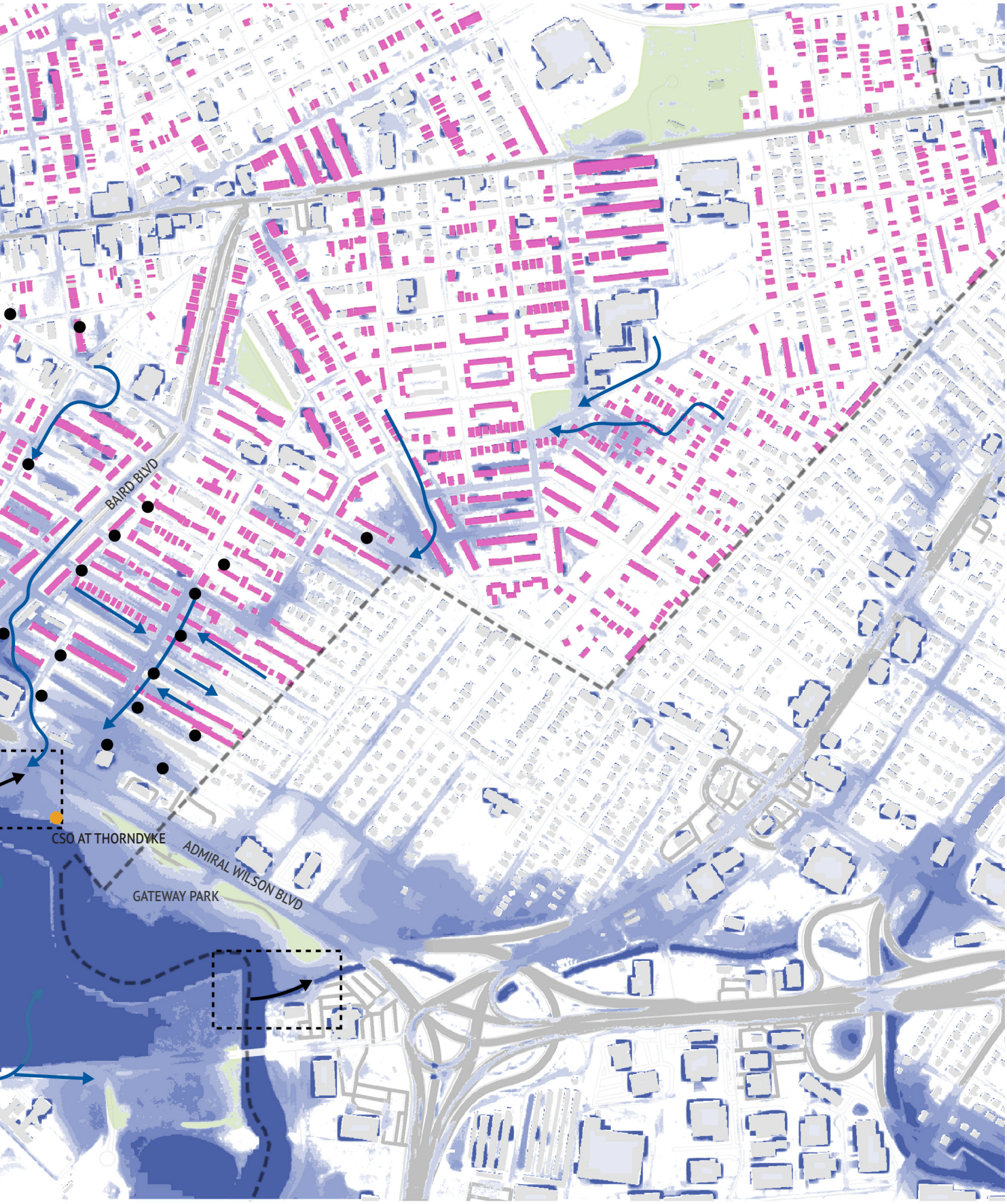
Black dots are the locations where our analysis of the sewers indicates that the sewers back up into the streets.



RAIN AND RIVER FLOODING IN 2024 IN MARLTON

LEGEND

- <1 FEET FLOODING
- 1-2 FEET FLOODING
- 2-4 FEET FLOODING
- <4 FEET FLOODING
- RIVER WATER
- RAIN WATER
- PREDICTED SEWER BACKUPS


BAIRD BLVD
CSO AT THORNDYKE
ADMIRAL WILSON BLVD
GATEWAY PARK

INTERCONNECTED PROJECTS DELIVER PERFORMANCE

The four green infrastructure projects that our team developed with residents, community leaders, policymakers, technical experts, and civic organizations will make a dramatic reduction in the burden of flooding in East Camden:

1. **Improve Gateway Park and contain flooding along the Cooper River**
2. **Prepare flood-prone land for sustainable redevelopment**
3. **Store and filter Combined Sewer Overflows (CSO)**
4. **Create a high-performance green infrastructure streetscape**

We designed these projects to eliminate flooding in typical storms and to perform well even under the most challenging flooding conditions, reducing the duration and depth of flooding measurably. To test their preliminary effectiveness, we incorporated them into a second, more localized flood modeling tool. This time we simulated flow through all of the community's sewer pipes during a hypothetical 10-year, 24-hour rainfall event—one that has only a 10% chance of being exceeded in any given year. We made things worse by assuming the rain was accompanied by a very significant storm surge or high water in the rivers as it was in the major storm in January 2024. These kinds of "compound" conditions are rare now, but will happen more often in the future.

The summary of the performance and estimated costs of these projects is on Pages 68-69.

We found that even during these extreme conditions, the four projects will eliminate nearly 3 million gallons of sewage backups into the streets and provide a 25% reduction in combined sewer overflow volume for this particular extreme event alone. Under less extreme, more routine precipitation and river conditions, these projects would likely eliminate flooding entirely in many areas and reduce the number of times rain causes flooding in a year. And even in the extreme storm that we simulated, the total volume of flooding in Marlton is reduced by 34% and the duration of flooding is significantly shortened.

These four projects represent a strategic beginning rather than a complete solution to Camden's flooding challenges. **Addressing all of the city's resilience needs and preparing for sea level rise in coming decades will require investments in multiple neighborhoods, policy changes to improve stormwater management citywide, and ongoing maintenance programs to ensure long-term effectiveness. However, concentrated investment in East Camden can set an important precedent, demonstrating how public open spaces, natural systems, and recreational assets can be integrated into a comprehensive vision for community flood protection with measurable results.**

The concept designs for the projects outlined in the section that follows are specifically designed to align with National Fish and Wildlife Foundation funding criteria, but they also align with the criteria of other funders, and address the priorities that emerged from our community engagement process. Success in East Camden would provide a replicable model for the rest of Camden and the Philadelphia region.

The proposed investment of approximately $107 million across four projects, organized into eleven project components with budgets of $10 million or less, will transform not just how East Camden manages water, but how residents connect with the Cooper River ecosystem. **For a community that has long faced environmental challenges, these projects offer a vision of what's possible when flood protection, habitat restoration, and community development are integrated.**

This chapter provides more detail on the locations of the projects and how they work—their specific habitat and social benefits, and offers some examples of similar projects that have succeeded in other cities. The chapter closes with our evaluations of the projects and our recommendations on the highest priority investments for immediate action.

Image 15: Diagrammatic section through Gateway Park, and Admiral Wilson Blvd showing interconnected projects along the Cooper River that reduce flooding. Source: PennPraxis

1 IMPROVE GATEWAY PARK AND CONTAIN FLOODING ALONG THE COOPER RIVER

The first project makes Gateway Park an active part of flood protection for Marlton while creating new assets prioritized by the community. The five interconnected components of this **project total $47.5M** including construction costs, soft costs, and contingencies.

Grants and appropriations of $39 million in Phase 1 of the LINK Trail will soon connect Gateway Park to Farnham Park, Camden High School, and New Camden Park and the wider 750-mile Circuit Trail network of pedestrian and bicycle trails in New Jersey and Pennsylvania. **Elevating the LINK Trail in Gateway Park will create a berm or levee that provides flood protection by preventing the Cooper River from swelling into Admiral Wilson Boulevard and Marlton's residential area.** And by re-sculpting the park, lifting and lowering the terrain gracefully, we can shape inviting park spaces that are more sheltered from the roadway, and temporarily store stormwater in the park to relieve flooding in the Marlton community and the Boulevard.

At Gateway Park, we propose building the protective berm to elevation 10 along the riverfront to shield the Marlton community from the kind of coastal flooding that will become more common as sea level rises. The berm is designed to be high enough to provide protection against the high tides observed in January 2024 with room for an additional 2 feet of sea level rise. Along the river, the shoreline will be restored with native trees and shrubs that stabilize eroding banks while creating habitat for fish and birds, including key species like the bald eagles, great blue heron, and Atlantic sturgeon.

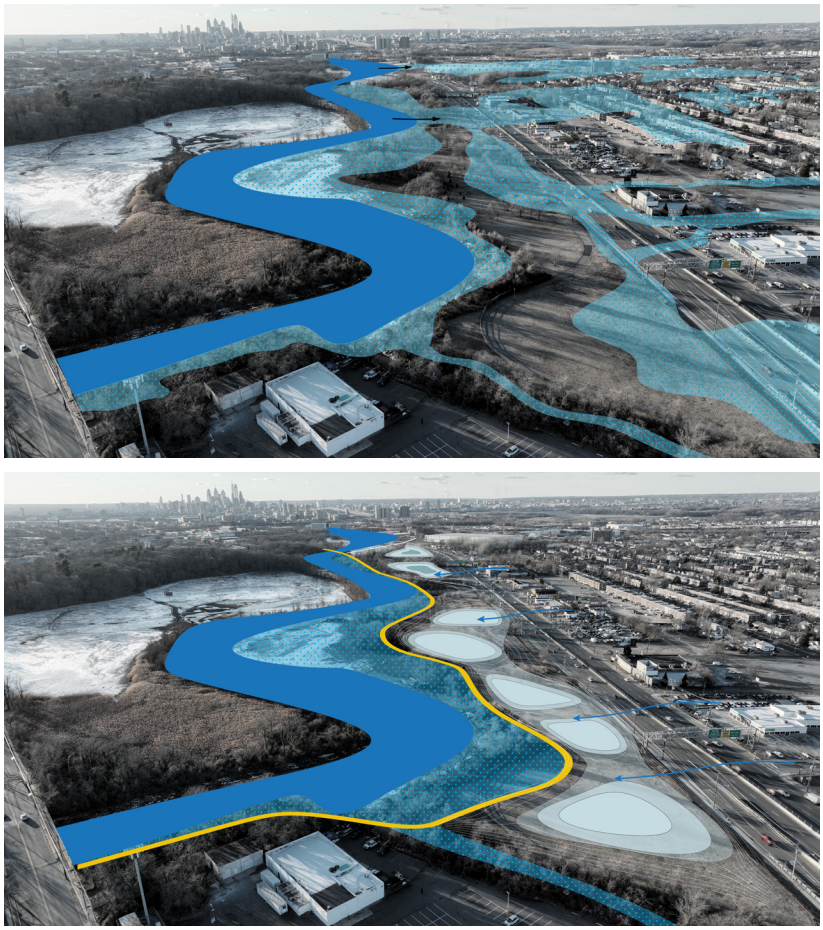


Image 16: Before (top) and after (bottom) diagrams of Gateway Park. On the right, a new berm along the Cooper River acts like a levee, blocking floodwaters from reaching Admiral Wilson Boulevard and nearby homes. Behind the berm, new basins temporarily hold stormwater draining floodwater from the neighborhood. Source: PennPraxis

Image 17: Community-driven conceptual vision for Gateway Park proposes placing the LINK Trail atop a flood-protection berm. This is a view of one of the shallow basins with the berm in the background. Source: PennPraxis

The proposed environmental center will provide educational opportunities that connect classroom learning with habitat access along the restored shoreline. Together, the restored shoreline and environmental center will offer the public a unique opportunity to engage with a functioning floodplain ecosystem. The environmental center will incorporate bathrooms (there are currently no bathrooms in the entire park), and create a hub for programming and stewardship that connects the neighborhood and students from nearby schools. The bathroom and programming will complement Camden County investment in a new kayak and canoe launch that will go into construction this year.

Behind the flood protection berm, new sports fields and a multi-use recreation area desired by East Camden communities are designed to temporarily hold rainwater from the neighborhood when the Cooper River is high. This system works by separating stormwater from the overwhelmed combined sewer system and storing it safely in park spaces until river levels drop enough for the water to drain away. The sports fields and recreation areas will be contoured so they sit 4 feet below the surrounding landscape, creating natural collection points for stormwater while maintaining their function as community gathering spaces. During dry periods, these areas will host basketball games, soccer matches, community events, barbecues and other gatherings. During storms, they will fill with rainwater. Around these basin areas, native trees will provide shade for park users, habitat for wildlife and insects, and a thicker urban canopy.

Finally, on the other side of the river, the Farnham Park living shoreline will create a pedestrian walkway with access to restored river habitat along the Cooper River. The existing berm, which was originally built to enclose a reservoir and support a road, will be stabilized and enhanced to provide riparian habitat with native trees and shrubs adapted to wet conditions. These plantings will create additional habitat immediately across the river from Gateway Park for turtles, fish, filter feeders, and wading birds including the great egret and black-crowned night heron. Both sides of the river will be accessible from the new kayak and canoe launch.

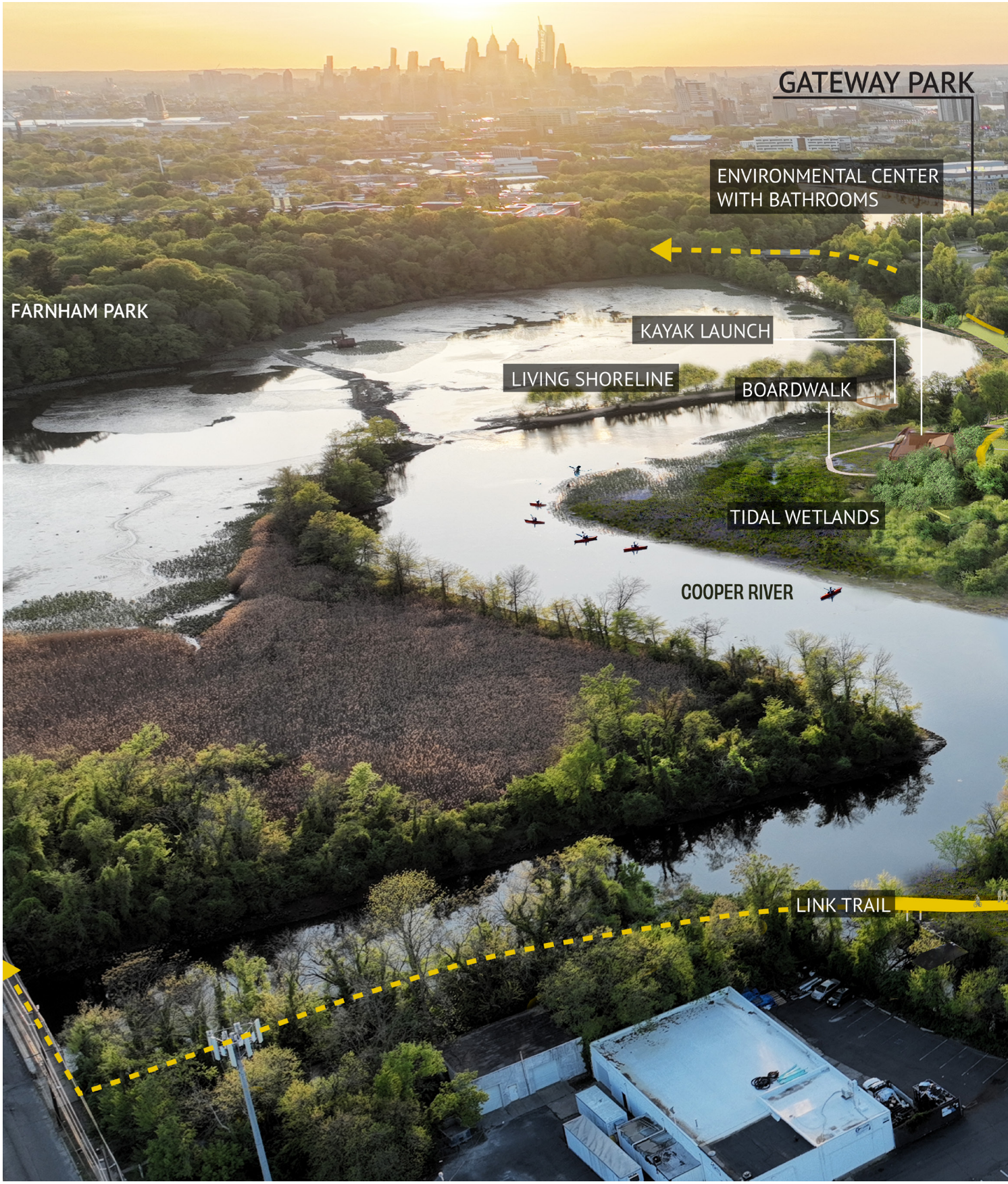
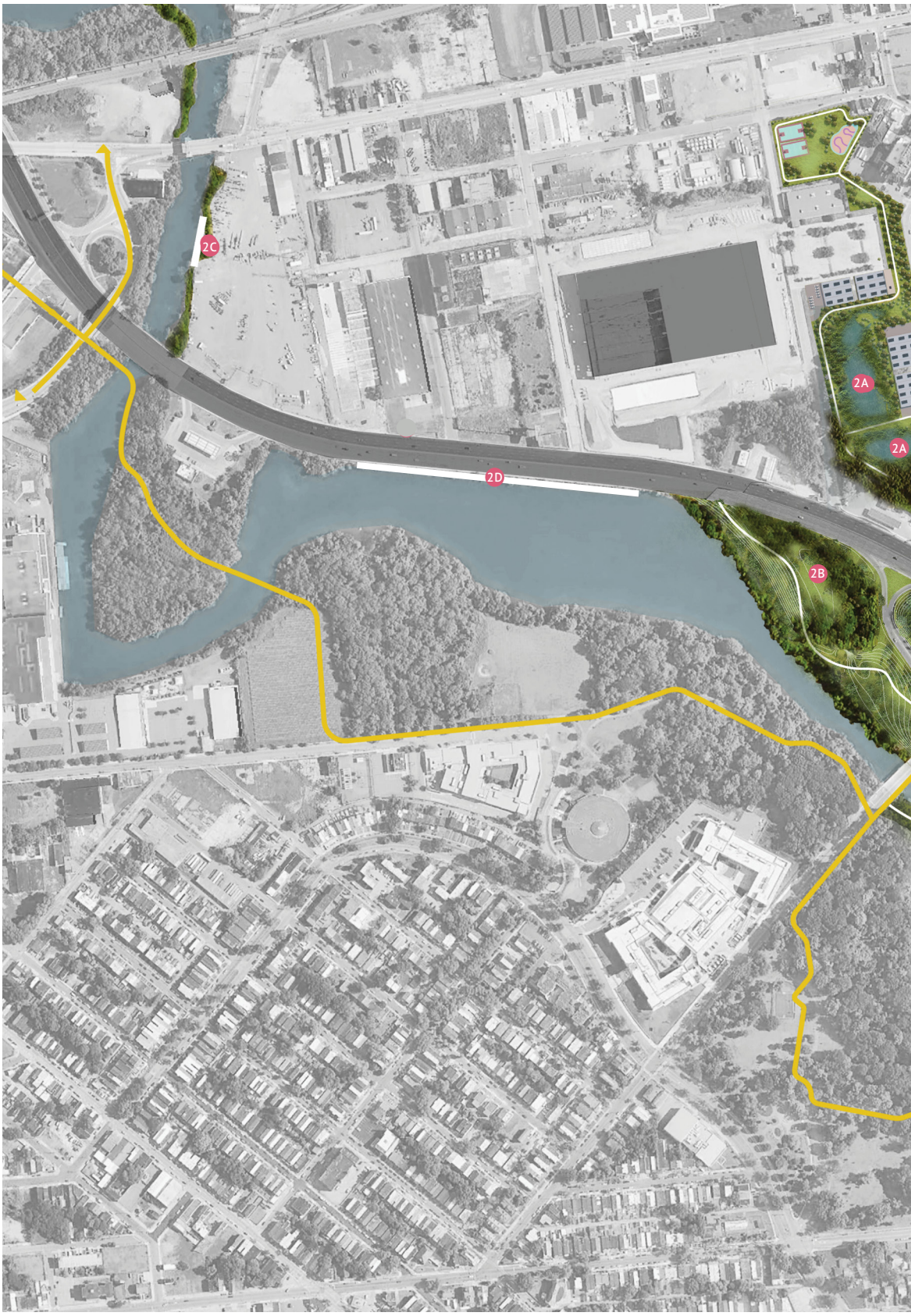


Image 18: Community vision for a resilient, active and beautiful central park for Camden that connects people with the Cooper River and links Gateway Park, Farnham Park, New Camden Park, Camden High School and adjacent communities. Source: PennPraxis


COMBINED SEWAGE
TREATMENT WETLAND
MARLTON NEIGHBORHOOD
GATHERING SPACE IN
DRY DETENTION BASINS
PARKING
PICNIC AREA
IN DRY DETENTION BASINS
NATURAL PLAYGROUND
IN DRY DETENTION BASINS
SPORTS RECREATION
IN DRY DETENTION BASINS

Map: Illustrative plan of four infrastructure projects in East Camden, showing how they work together as a green system.

Each component of the larger projects is numbered.



ILLUSTRATIVE PLAN

LEGEND

1 GATEWAY PARK AND CONTAIN FLOODING ALONG THE COOPER RIVER

- 1A FLOOD PROTECTION BERM AND LIVING SHORELINE
- 1B SPORTS FIELDS AND COURTS IN DRY DETENTION BASIN
- 1C GATHERING SPACES AND PLAY AREA IN DRY DETENTION BASINS
- 1D ENVIRONMENTAL EDUCATION CENTER AND BATHROOMS
- 1E FARNHAM PARK LIVING SHORELINE

2 PREPARE FLOOD-PRONE LAND FOR SUSTAINABLE REDEVELOPMENT

- 2A DEVELOPMENT PADS AND WETLAND TREATMENT
- 2B WETLANDS FOR INCREASED WATER STORAGE
- 2C GREEN BULKHEAD ON THE COOPER RIVER NEAR MICKLE STREET
- 2D GREEN BULKHEAD ALONG ADMIRAL WILSON BLVD AND COOPER RIVER

- 3 STORE AND FILTER COMBINED SEWER OVERFLOWS
- 4 HIGH-PERFORMANCE GREEN INFRASTRUCTURE STREETSCAPE
- LINK TRAIL


4
3
3
3
1A
1C
1E
1C
1D
1B
1A
1B

The five components of the Gateway Park project would cost roughly $47.5 million, and they can be funded and built independently over time. The elevated flood protection berm for the LINK Trail (Project 1a) is the most cost effective of the 5 components in terms of reducing flood depths in Marlton, Pennsauken and on Admiral Wilson Boulevard. It also adds more than 7 acres of restored habitat and recreational public space. The gathering spaces in dry detention basins are also effective at reducing flooding and CSOs, and rank as high priority projects (see **Pages 68-69**). The estimated costs of the individual components of the Park Project are:

1a. Gateway Park flood protection berm and living shoreline $9.87 million

1b. Gateway Park sports fields and courts in dry detention basins $8.92 million

1c. Gateway Park gathering spaces and play area in dry detention basins $9.02 million

1d. Gateway Park environmental education center and bathrooms $9.78 million

1e. Farnham Park living shoreline $9.95 million

See the locations of these project components on Pages 54-55

Learn more about the performance of the Gateway Park projects on Page 68

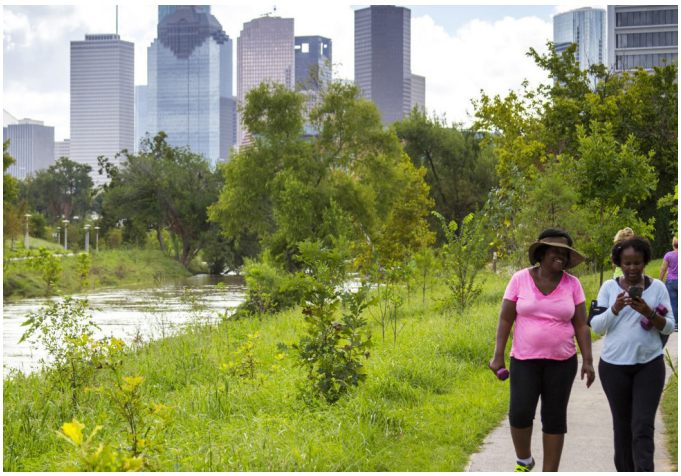
EXAMPLES OF OTHER PROJECTS LIKE THIS

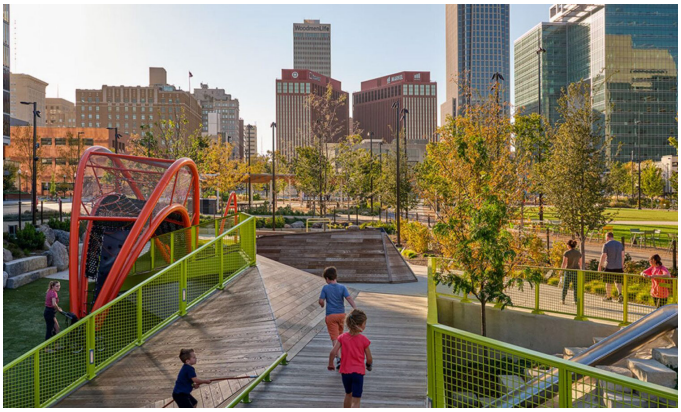
The Gateway Park project brings together well-tested best practices in flood protection with some state-of-the-art approaches for holding the enormous quantities of rain that come with intense "cloudburst" events. There are many examples of parks that have been adapted or developed to support flood protection. The images at the right are of river parks built in recent years with climate change in mind. The NewBo Sinclair Levee and Trail in Cedar Rapids, Iowa is one of many examples of a flood protection barrier berm that is integrated with a park and river trail. It was designed to withstand heavy river flooding of up to 3 feet above the 500-year flood mark–levels that were reached in a major 2008 storm. The NewBo project features a 12-foot wide path that runs on top of the levee, providing bike and pedestrian access and great views of the river. While levees have failed in some high profile cases, it is unusual and typically happens where the water energy is very high, for example on sea coasts, or when the levee was not designed for future conditions.

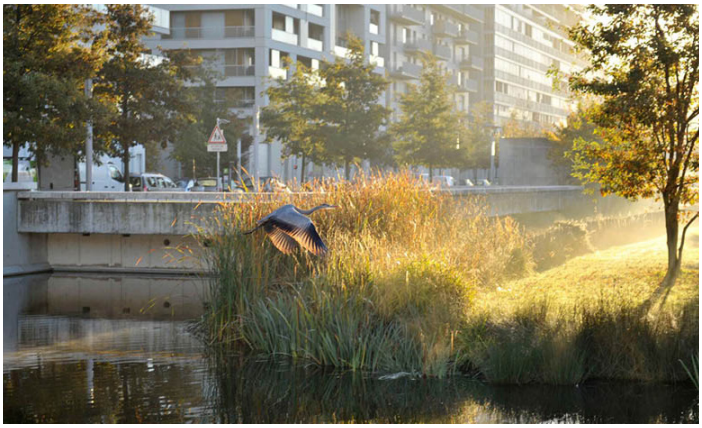
Image 19: Examples of resilient design that integrate flood protection with public space, levee trails, sports fields and play: Buffalo Bayou Park in Houston, Mill Creek Park in Stamford, East Side Park in New York City, Billancourt Boulogne near Paris, Tom Lee Park in Memphis, and an urban floodable park in Copenhagen.

Sports fields and courts that either store water underground or flood and drain gracefully like those we propose are similar to the ones that are part of comprehensive flood mitigation approaches in the redesigned East Side Park in Manhattan and Tom Lee Park in Memphis. As part of the Cloudburst program in Copenhagen, Denmark, the city has built attractive floodable sports fields and parks that can hold large volumes of water during heavy rainfall. The fields are situated below grade, in parks and courtyards. They include inlets to allow stormwater to enter directly from other infrastructure including the roadways, and they quickly drain sports facilities after storms have passed.

Learn more about precedents for the Gateway projects in Deep Dive A4





DESIGNING PARK UPGRADES WITH THE COMMUNITY

Learn more about the East Camden design meetings that shaped early action projects in Deep Dive A7

The design and programming of park upgrades were shaped by the engaged community, the New Jersey Conservation Foundation, Trust for Public Land, Camden County Municipal Utilities Authority, Camden County Parks, the LINK Trail, Urban Promise and others involved in managing and planning for Gateway's future. The key to the community's vision for Gateway Park and connections to the Cooper River and Farnham Park is attracting enough investment to make the park active, accessible, and safe. Investments in flood resilience can support this goal.

Many participants in our East Camden community meetings say it feels like Gateway Park was not designed for them. Its legacy is not as a park for people, but for travelers passing through. Resident Shirley Irizarry tells us, "The park doesn't get used, and I always felt like that was by design." Saraly Gonzalez, the Environmental Education Program Director for Urban Promise observes, "There's nothing that brings people there—no playgrounds or bathrooms. There isn't even a loop, the trail just ends."

At the same time, everyone who walks the site with us, or participates in the community visioning sessions, sees Gateway has incredible potential to bring joy to a community, to protect it from flooding, and to offer habitat for wildlife.

Image 20: Community visioning workshop in East Camden, with Saraly Gonzalez synthesizing the ideas and input from her table. Source: Ellen Neises

Through community meetings and surveys, we learned from residents, including some recent graduates of Camden High School, what kind of features and programming they think would be most successful in bringing the community together in Gateway, and what kinds of floodable park features would be most welcome, using examples from other successful parks. **Based on the input CFET collected, there are two categories of improvements residents are most interested in:**

1. **Community gathering spaces and recreational facilities that draw diverse residents to the park, including a place for movie nights and cookouts, basketball courts, a playground, and sports fields**, and

2. **Environmental education, kayak launch and other water access opportunities, and wildlife habitat improvements to create immersive experiences of nature.**

People are very enthusiastic about environmental education and water access. Residents are interested in the concept of "floodable parks" that could serve multiple purposes. Rather than viewing flooding as something to simply prevent, people understand how spaces could be designed to work with water while maintaining their community function. The concept design incorporates this input from the community.

"I think about creating programming for the youth to be able to have access to the water, because it's not something that they have access to. My whole life living here, I never did anything in the water at the waterfront, and I live right across."

-SHIRLEY IRIZARRY, RESIDENT AND CFET OUTREACH COORDINATOR

"My family all went to Camden High. At lunch they used to picnic in Farnham Park. I heard about dates happening there. It almost was a part of the school campus. When they're talking about it, it almost feels like a college campus... I remember... my grandfather gave me his high school yearbook—he graduated in 1942—and there were pictures in his yearbook when the park was exactly what it was intended. And to see how beautiful it was when that pavilion was there. Kids used to go out at lunchtime and sit there surrounded by the meadows."

-OLIVIA GLENN, CAMDEN-BORN, PRESIDENT, BAOBAB BLOSSOM CONSULTING

"I would like to see an environmental center, wildlife habitat, natural playground and boardwalks. And I think instead of us just taking from an environment, we should give back... 60-70% of Camden is already grown. So much concrete, so much asphalt and we just keep taking and taking from the environment."

-BREINER GARCIA, EAST CAMDEN RESIDENT

2 PREPARE FLOOD-PRONE LAND FOR SUSTAINABLE REDEVELOPMENT

This project will transform a cluster of publicly-owned vacant lots between 19th and 20th Streets, and Federal Street and Admiral Wilson Boulevard, into a green industrial park with an interconnected wetland system designed to hold and clean large volumes of stormwater diverted from the surrounding neighborhood during storms. The project reduces flooding on Admiral Wilson and in adjacent public housing and businesses, and creates attractive, protected development sites in an area that frequently floods now, and will be more flood-prone as sea level and the Cooper River rise.

This green industrial park will store and treat the runoff before slowly releasing it to wetlands in Gateway Park and eventually to the Cooper River. The wetlands will provide public access and habitat, turning a neighborhood liability into a community asset. The wetlands will include diverse planting, particularly freshwater wetland plants that are most effective at water quality filtration. The wetlands will provide valuable habitat for amphibians such as green and northern leopard frogs, birds such as the great blue heron and killdeer, and mayflies and damselflies. A new playground adjacent to the elementary school will store more rainwater underground and reduce the number of days the school's activities are affected by flooding.

In locations where the Cooper River regularly overflows and causes flooding, a "green bulkhead" will provide coastal flood protection for Admiral Wilson Boulevard and for businesses and development sites in the Federal Street district. A green bulkhead is a barrier wall that integrates aquatic habitat restoration for fish and other river species.

The design approach and programming were shaped with input from the Camden County Improvement Authority, the New Jersey Department of Environmental Protection's Brownfields Division, the City of Camden and the CCMUA. It incorporates government plans discussed with the community to create a playground on this public land, as well as the creation of elevated development pads. Integrating sustainable development with public amenity in this way involves four components that would cost approximately $40.2 million.

2a. Green industrial park with development pads, wetland treatment, and playground $9.82 million

2b. Gateway Park wetlands for increased water storage $9.56 million

2c. Green bulkhead on the Cooper River near Mickle Street $9.54 million

2d. Green bulkhead along Admiral Wilson and Cooper River $11.28 million

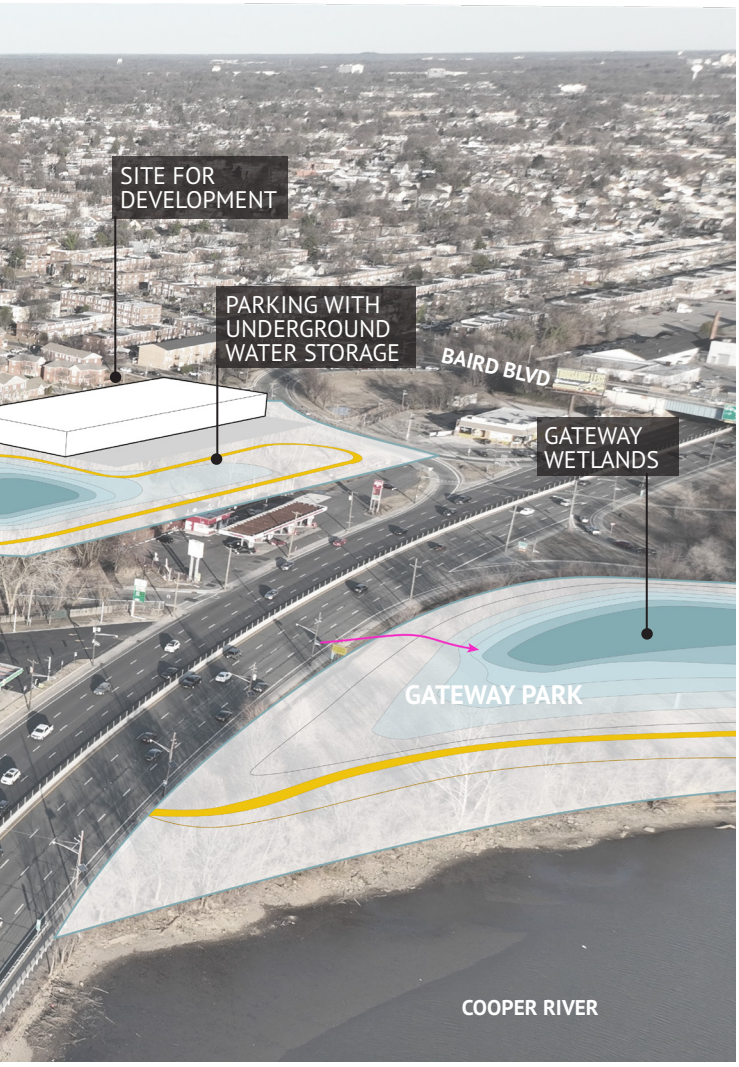


Image 21: Diagram of proposed development and treatment wetlands for the green industrial park site. The design integrates green stormwater infrastructure with redevelopment, featuring cascading treatment ponds that will capture and clean runoff from the surrounding area. Treatment wetlands are strategically positioned in relation to proposed building sites to maximize both flood protection and ecological benefits for the community. Source: PennPraxis

Our analysis shows that these four project components produce high levels of benefit, particularly the green industrial park (component 2a). The green industrial park ranks high on all of the performance measures we evaluated. It will significantly reduce flooding on Admiral Wilson, in the adjacent community, at the school, and business district. It is highly effective at reducing sewer backups in the neighborhood, it produces major habitat improvement, and creates valuable public space adjacent to public housing and a school.

The design approach and programming were shaped with input from the Camden County Improvement Authority, the New Jersey Department of Environmental Protection's Brownfields Division, the City of Camden and the CCMUA. The project incorporates plans discussed with the community to create a playground on this public land, integrating sustainable development with public amenity. **It will reduce flooding in a community living with mold and water damage in public homes they cannot remodel to adapt to climate change. A project like this can also attract businesses to locate in the area by solving the flooding and creating a positive address.**

Learn more about the performance of the sustainable redevelopment projects on Page 69

Image 21: The Historic Fourth Ward Park in Atlanta created high-capacity green infrastructure that managed the city's water problems and created community value. Source: Urban Land institute (ULI)

EXAMPLES OF OTHER PROJECTS LIKE THIS

The project integrates flood risk reduction into a stepped series of treatment wetlands that work together, with water moving from the top basin to the bottom, getting progressively cleaner. Our team's landscape architect and engineers designed a similar project called the Muscota Marsh on the Harlem River, which won an award for Excellence in Design in the infrastructure category from the City of New York (2013). Muscota Marsh combines stormwater filtration, ecosystem services, environmental education, access to a boathouse and a beautiful place to enjoy the Harlem River in a very compact 1-acre park. A series of cascading and connected freshwater wetlands were constructed to receive and filter stormwater runoff before it enters the Harlem River. Tidal salt marsh habitat was restored along the edge of the river with a boardwalk through the park, providing public access along the riverfront. The Historic Fourth Ward Park in Atlanta is a larger example of the same green infrastructure concept with deeper storage.

Image 22: Muscota Marsh on the Harlem River, New York City. The design integrates treatment wetlands, ecosystem services, and public amenities including a boardwalk, boat access, and environmental education opportunities. Source: eDesign Dynamics and Field Operations

3 STORE AND FILTER COMBINED SEWER OVERFLOWS

This project relieves the CSO problem that causes some of the most severe environmental burdens in Marlton, and wildlife impacts in the Cooper River. The project targets the most severe combined sewer back up problem around Randolph Street to eliminate basement flooding. The additional storage will also reduce CSOs from two of the largest sewer overflow points in Camden: Thorndyke and C27, which together release 56.6 million gallons of runoff and untreated sewage into the Cooper River during an average year. Environmental law requires CSOs to be significantly reduced, and CCMUA is developing the Long Term Control Plan to do just that citywide.

Marlton's sewers back up into streets, alleys, and basements, and many residents have constructed make-shift barricades out of cinder blocks and other materials to keep sewage out of their homes. The sewage back ups occur during extreme rain storms, when the volume of stormwater in Marlton, and in neighborhoods higher on the hill like Dudley and Stockton, is too high to flow through an undersized sewer system. Some segments of pipe can be as small as 12 inches in diameter; others are collapsing, or filled with sediment. In the river, the ends of these pipes are underwater more of the time as river levels rise, making it harder for them to drain. When the volume is greater than the capacity of the pipes, water and sewage escapes through manholes onto the street or through drains into basements.

Image 23: Homes in Marlton facing sewer back ups where many residents have constructed make-shift barricades. Source: Franco Montalto

At an estimated cost of $9.9 million, this project reduces CSOs and sewage flooding by redirecting a portion of the combined sewage in sewers to specially designed treatment wetlands within fenced cloverleaf interchange between Admiral Wilson Boulevard and Baird Avenue. This land is owned by the New Jersey Department of Transportation and is in an inaccessible area, far from the community. **The wetlands will store and filter the sewage before it reaches the river, also relieving pressure on the sewer pipes.**

The constructed wetlands will use physical, chemical, and biological processes to remove pollutants and pathogens from the combined sewage. These kinds of nature-based solutions typically have lower construction, operation, and maintenance costs than more conventional forms of chemical treatment, and provide better treatment than end-of-pipe treatment facilities (options that CCMUA is studying in the development of the Long-Term Control Plan.)

The system will consist of two connected basins that fill in sequence, providing staged treatment that settles solids and promotes microbial breakdown of contaminants. When both basins are full, the much cleaner water will be allowed to overflow into the Cooper River, dramatically reducing the pollution load compared to current conditions. Beyond water quality benefits, these wetlands will include dense native vegetation, creating valuable habitat for amphibians such as green and northern leopard frogs, birds such as the great blue heron, and a variety of insects, pollinators, and small mammals.

Our analysis shows this project is the most effective of the four projects at reducing sewer back ups in the streets and CSO is the Cooper River. It is also highly effective at reducing the depth of flooding in Marlton. The project will demonstrate how infrastructure can provide multiple environmental services, both through the creation of habitat and through the reduction of CSO.

Learn more about the performance of the CSO project on Page 69

Image 24: The Harbor Brook CSO treatment wetland in Syracuse, NY. Source: City of Syracuse

EXAMPLES OF OTHER PROJECTS LIKE THIS

CSO treatment wetlands are common in Germany, the United Kingdom, and other places in Europe, and interest in this nature-based approach to CSO treatment is growing in the US. For example, the city of Syracuse, New York uses the Harbor Brook treatment wetland to treat CSO before the filtered water is released into Onondaga Lake. The Harbor Brook wetland captures and treats approximately 14.8 million gallons of combined sewage each year and substantially improves the quality of the water in the stream and lake. In addition to improved water quality, the project provides natural habitat, recreation, and educational opportunities.

4 CREATE A HIGH-PERFORMANCE GREEN INFRASTRUCTURE STREETSCAPE

Green infrastructure improvements along Baird Boulevard will capture stormwater at its source while creating beautiful green spaces in a heavily developed corridor at a cost of $9.3 million. **Taking advantage of the 22-foot wide median strip and nearby vacant lots, this project installs bio-retention basins, rain gardens, tree trenches, and permeable pavement designed to intercept runoff before it reaches the overwhelmed sewer system.**

These improvements will be planted with native trees and shrubs that provide shade, wildlife habitat, and air quality benefits while managing stormwater. The project follows successful models from Philadelphia, New York City and other cities with strong green infrastructure programs developed to reduce CSOs while beautifying and cooling neighborhoods and providing habitat benefits. By designing these features to store more than the usual "first flush" of stormwater generated from the surrounding impervious areas, the project can provide flood management and create more walkable, attractive streetscapes that support local businesses and improve quality of life for residents. Our analysis shows this project makes a significant contribution to reducing flooding and sewage back ups, but it is somewhat less cost-effective than the other three proposed infrastructure projects.

EXAMPLES OF OTHER PROJECTS LIKE THIS

Throughout the country, urban stormwater managers are implementing strategies for managing stormwater on underutilized public space within the rights of way of roads. New York City's Greenstreets stormwater program is a strong example. In Queens, New York (just one of the boroughs where Greenstreets is operating), seven small green spaces totaling three acres capture 5 million gallons of stormwater annually, relieving capacity in the sewer system and reducing local flooding and sewer overflows into Jamaica Bay.

Image 25: Green infrastructure medians at Martin Van Buren High School, New York. Source: NYCDEP

04 FIRST PROJECTS BASED ON PERFORMANCE BENEFITS

Each of the four early action projects is broken into roughly $10 million components to facilitate fast action, to support phased implementation and to attract support from multiple funders with different priorities and funding programs. Some of the $10-million component projects are designed to be particularly attractive to specific funders or to integrate with projects moving into design and implementation, like Phase 1 of the LINK Trail through Gateway Park. Others could become part of the CCMUA's Long Term Control Plan to reduce CSOs by 85% system-wide.

We recommend prioritizing implementation of 6 of the 11 project components that make up the four major infrastructure projects, ranked below in order of priority based on estimated performance, cost-effectiveness, and potential for cost-saving integration with projects already in motion:

1. **Gateway Park flood protection berm and living shoreline—#1a, $9.87 million**
2. **Gateway Park gathering spaces & play area in dry detention basins—#1c, $9.02 million**
3. **Combined sewer overflow storage and treatment in wetlands—#3, $9.9 million**
4. **Green industrial park with development, wetlands & playground—#2a, $9.82 million**
5. **Green bulkhead along Admiral Wilson Blvd and Cooper River—#2d, $11.28 million**
6. **Gateway Park sports fields and courts in dry detention basins—#1b, $8.92 million**

We evaluated each project component across several criteria to compare them in different ways. **When implemented together, the opportunity for integrated benefits is multiplied, but each component is designed to bring immediate benefit on its own.**

Learn more about the community and habitat benefits and the performance of these projects in Deep Dive A4

The project components will provide 4 main categories of benefit:

- Reduced volume, depth, and duration of flooding experienced in the Marlton community, with expected reductions in property damage and impacts to traffic circulation, particularly on Admiral Wilson Boulevard
- Reduced volume of combined sewage that backs up into the streets and overflows in the Cooper River, with significant improvements to human and ecological health
- Increased habitat measured in acres and estimated habitat value
- Increased area of public space and provision of desired recreation facilities

The results of our evaluation are shown in Table 1. Each project was given a score from 0 to 4.0 based on its performance relative to the mean of each given metric. These scores were assigned rankings, including High (H), High-Medium (HM), Medium (M), Medium-Low (ML), and Low (L). At a glance, the table provides an intuitive understanding of how the individual projects perform and which ones balance the four main criteria. More generally, the evaluation demonstrates the complementary nature of the individual project components and the value of project integration for maximum community benefits.

	PROJECTS	CSO Backup & Release into River	Flood Frequency, Depth, and Duration	Habitat Benefit	Public Space & Recreation	Composite Ranking
1a.	Gateway Park flood protection berm and living shoreline	M	H	H	H	H
1b.	Gateway Park sports fields and courts in dry detention basins	L	L	M	H	ML
1c.	Gateway Park gathering spaces and play area in dry detention basins	HM	M	M	H	HM
1d.	Gateway Park environmental education center and bathrooms	L	L	L	H	L
1e.	Farnham Park living shoreline	L	L	M	H	ML
2a.	Green industrial park with development pads and wetland treatment	HM	M	M	M	M
2b.	Gateway Park wetlands for increased water storage	M	M	M	L	ML
2c.	Green bulkhead on the Cooper River near Mickle Street	L	L	L	L	L
2d.	Green bulkhead along Admiral Wilson Blvd and Cooper River	M	H	L	L	M
3	Store and filter Combined Sewer Overflows (CSO)	HM	H	M	L	M
4	High-performance green infrastructure streetscape	M	M	M	M	M

Table 1 - Ranking table comparing the projects using a scoring system with five ranks: High (H), High-Medium (HM), Medium, Medium-Low (ML), and Low (L). Source: eDesign Dynamics.

05 STRATEGIES FOR ATTRACTING INFRASTRUCTURE INVESTMENT

Image 26: Camden's waterfront and downtown lie within the floodplain, making resilience investment essential.

Camden will not thrive without addressing the flooding challenges it faces now and in the future. Investment in resilience is widely considered financially sound. The World Resources Institute found that investing $1 in adaptation can yield more than $10.50 in benefits over 10 years, with annual average returns of 20-27% from avoided losses induced economic development, and social and environmental benefits that are generated even if disasters don't occur.[1] Resilience planning for New York's financial district provides a more specific example. Implementation of the plan is estimated to cost between $5 and $7 billion dollars. The benefit-cost ratio calculated to assess cost effectiveness of the plan indicates that $3.12 dollars worth of benefit for every $1 spent.[2] The analysis also estimated the cost of inaction between now and 2100 as $20.3 billion, including direct economic impacts, indirect economic impacts, building damage, relocation costs, contents damage and other social disruption costs. **Given the frequency and severity of flooding in East Camden and the many impacts and costs it creates, the benefits of investment here would significantly outweigh costs.**

This plan sets out effective and feasible solutions that will have meaningful impact when we can attract sufficient investment in the needed infrastructure. We believe that funding for all elements of this plan is feasible through Federal, State, County, City and philanthropic funding programs.

1 The Climate Adaptation Investment Case, World Resources Institute, November 8, 2021, and The High Cost of Inaction: Why Climate Adaptation Can't Wait. Beca, Apr. 2024

2 Estimated Costs of Inaction, Financial District and Seaport Climate Resilience Master Plan, Appendix: Estimated Costs of Inaction, New York City Economic Development Corporation (NYCEDC), March 2024

I DEMONSTRATE CAMDEN'S READINESS FOR RESILIENCE INVESTMENT

The Camden Coastal Resilience Plan is already gaining strong support from City, County and State policymakers. The plan's four infrastructure projects are designed to align with existing funding opportunities. The CFET planning team has begun to identify funding sources that align with the highest priority project components:

Learn more about these and other potential funders in Deep Dive A8

- The Gateway Park berm and living shoreline are good fits for the National Fish and Wildlife Foundation Delaware Watershed Conservation Fund, NJDEP's Office of Natural Resources Restoration, NJ Green Acres program, and the Tepper Foundation.

- Recreation and programming improvements to parks that also store water align with funding programs of NJ Green Acres, the NJDEP Department of Community Affairs Local Recreation Improvement program, and William Penn Foundation's Environment and Public Space program.

- NJ Water Bank and National Fish and Wildlife Foundation Delaware Watershed Conservation Fund programs align strongly with the CSO treatment wetland.

- The CSO separation project, green industrial park, and Gateway improvements directly align with the City and CCMUA's Long Term Control Plan designed to minimize sewage overflows.

- The green industrial park will be attractive to New Jersey Economic Recovery Act programs, and the NJDEP Office of Brownfield and Community Revitalization.

The next step would be to form a committed set of implementation partners who can expand on this initial prospect research by identifying three to five funders to reach out to about the plan. Conversations with potential funders like these will help evaluate their interest, available funding, application requirements and timeline for proposals. From there, the implementation partners can identify the most promising prospects and the appropriate implementation partner to lead proposal submission.

Partnerships expand capacity, identify funding, and create the political will necessary to drive implementation. A diverse set of partners will have deeper experience with a broader set of funding programs and will think more creatively about how and when those programs can move implementation forward. Multiple implementation champions can envision ways to connect elements of the plan to different initiatives or larger community development projects.

The core group of implementation partners—including neighborhood organizations, City and County partners, Camden Community Partnership, conservation and recreation organizations, the Camden Collaborative Initiative, and NJDEP—will need to develop strong relationships with State, Federal and philanthropic partners.

At the same time, selected implementation partners could actively engage the Federal Street economic redevelopment initiative, the LINK Trail project and other groups leading improvements at Gateway Park and Admiral Wilson Boulevard. These initial steps will help define a more detailed action plan to move the first projects to implementation.

2 BREAK LARGE PROJECTS INTO PIECES THAT CAN BE PHASED AND FUNDED BY MULTIPLE SOURCES

Our approach recognizes that it is unlikely that all the infrastructure projects and capacity-building strategies in this plan will be funded by one source or at one time. Full realization of the plan will likely take several years, many partners, and funding from a variety of sources. Looking across water plan implementation success stories, several common elements stand out. In addition to having a strong community-driven plan that prioritizes projects, building lasting partnerships and targeting a variety of funding sources to activate implementation stand out as the most important pathways to success.[3]

Matching individual funder's program priorities to pieces of the plan that fit that priority will increase the likelihood of success. Some funding programs may have a maximum amount that is less than the estimated cost of the project so phasing project implementation over several funding cycles can be a good strategy. Another is to seek funding from multiple funding sources for the same project (referred to as stacking funding). This approach can be particularly effective with funders who value seeing other funders show interest in the project or that outright require matching funds. Effectively packaging projects and elements to meet funding program priorities will build and sustain momentum toward full implementation of the plan.

Image 27: Brownfield remediation of the site that is now the Cramer Hill Waterfront Park.

"[There are great examples] of how initial Federal funding can prime New Jersey towns and regions to leverage further funding from multiple sources to achieve more holistic resiliency, as opposed to one or two projects addressing one climate threat. "

-JON MILLER, DIRECTOR OF THE NJ COASTAL PROTECTION TECHNICAL ASSISTANCE SERVICE AT NJDEP

[3] Examples of other successful projects that have integrated partnership building and aligned with funding opportunities:

https://www.tpl.org/resource/protecting-source;

National Association of Climate Resilience Planners, Community-Driven Climate Resilience Planning: A Framework, Version 2.0, http://www.nacrp.org/;

EPA, A Quick Guide to Developing Watershed Plans to Restore and Protect Our Waters, May 2013.

A good example of assembling funding from diverse sources is Camden's Cramer Hill Waterfront Park on the Delaware River. The 86-acre Harrison Avenue Landfill operated from the 1950s through the 1970s, though unauthorized dumping continued for years afterward. Redevelopment of the site began in the early 2000s.

To remediate the site, the NJDEP provided $22 million from the Hazardous Discharge Site Remediation Fund (HDSRF) along with another $4 million in public funds. The Department's Office of Natural Resource Restoration allocated an additional $48 million in natural resource damage settlement monies from polluters to transform the remaining 62 acres of the landfill into the Cramer Hill Waterfront Park—an overall investment of $133 million. In 2014, the Salvation Army opened the Kroc Center on 24 acres of the site, using a $59 million gift from the estate of Ray and Joan Kroc. Today the center provides vital services to over 8,000 residents, including healthcare and access to a food pantry. The 62-acre project focused on four overarching goals—shoreline protection, landfill closure, natural resource restoration, and recreation. The success in Cramer Hill is a replicable model for funding Gateway Park improvements and other priority projects.

3 INTEGRATE RESILIENCE ACTION WITH PROJECTS THAT ARE ALREADY IN MOTION

Emphasizing the connections between this plan and economic development initiatives or community open space initiatives will help leverage additional funding resources. For example, integrating Gateway improvements with the LINK Trail will multiply the benefit and reduce the cost of flood protection, and attract infrastructure, habitat and recreation funders. Federal Street is currently the focus of an economic development investment initiative by the City of Camden and the Camden County Improvement Authority. Effective flood mitigation and protection elements on publicly owned sites will help secure private development. The CSO separation project directly aligns with the Long Term Control Plan designed to minimize sewer overflows.

Integration across existing initiatives not only provides access to additional funding sources, it helps realize multiple benefits for the community more broadly and uses any available funding more efficiently and effectively to achieve those multiple benefits. It shows funders that Camden is leveraging its expertise and capacity to achieve more holistic progress.

06 INTEGRATION WITH OTHER EFFORTS TO MANAGE WATER

The four infrastructure projects proposed in the Camden Coastal Resilience Plan represent an integrated strategy for managing river, rain and combined sewer flooding. The projects are designed to support the goals of the Long Term Control Plan (LTCP), which CCMUA is developing and implementing in stages to reduce the volume of CSOs into the Delaware and Cooper Rivers by 85% system-wide. In January 2025, Camden, Gloucester, and CCMUA entered into new NJPDES Surface Water Quality Permits with the State. The NJDEP mandated that the three government entities review their previous Selection and Implementation of Alternatives Report (SIAR) and update the planned project schedule, incorporating hard commitments and dedication of funds to finally implement the LTCP.

Through targeted analysis, our planning process has helped the CCMUA identify drainage system improvements that support the City of Camden's CSO compliance goals with the NJDEP while simultaneously addressing sewage back ups in Marlton. Specifically, our plan supports the LTCP by introducing watershed-scale strategies that mitigate flooding and pressure on the aging sewer system, creating options beyond the expensive end-of-pipe solutions that have been the focus of the CCMUA's analysis of alternatives to date.

CCMUA collaborates with its municipal partners in Camden and Gloucester on the development of the LTCP since the infrastructure managed by the three system owners (Camden, Gloucester and CCMUA) is hydraulically connected, and strategies for reducing the CSO volume, for which each entity is responsible, must be planned together. From a regulatory perspective, the CCMUA is responsible for fixes to the C32—a CSO in Cramer Hill that is owned by CCMUA. Two of the largest and most problematic outfalls owned by Camden City—Thorndyke and C27—are in Marlton. The C27 / Thorndyke sewer shed is one of two in Camden City that is likely to require the construction of expensive satellite treatment facilities in order to meet the LTCP goal of 85% reduction of CSO volume. (The other CSO problem sewer shed is C22 / C22-A.) For this reason, CCMUA is keenly interested in collaborating with the City of Camden to develop strategies that reduce CSOs in Marlton.

While the LTCP process requires permit holders to develop strategies for reducing CSO volumes, it does not require that the same plan also reduce flooding, or sewage back ups in the neighborhood. One of the most valuable outcomes of the Camden coastal resilience planning effort has been the development of conceptual solutions that accomplish multiple goals.

Because our plan includes solutions that reduce CSO, it can be easily incorporated by CCMUA into the alternatives analysis informing the LTCP. Because these same solutions also reduce sewage back ups, provide coastal protection, create new habitat, and reduce the burden associated with flooding, they build overall resilience of Marlton—an outcome that would not have been achieved by the LTCP alone.

Image 28: Combined sewer overflow. Source: Shutterstock

Our plan fills critical planning gaps between the LTCP and the resilience needs of Marlton. Our team's modeling shows that the proposed projects will significantly improve management of extreme weather events, storing 12.6 million gallons of total stormwater, including 2.9 million gallons of sewer back ups and 3.9 million gallons of combined sewer overflow into the river—corresponding to 34% and 8% reductions at the two outfalls in an extreme event. The designs are particularly effective during smaller storms, where flooding and CSO may be fully eliminated. Projects are ranked based on cost-effectiveness in addressing sewer surcharge and CSO volumes. The proposed CSO treatment wetland (project 3) is designed to intercept and treat overflow before it reaches the Cooper River, thus reducing pathogen and nutrient loads. Other projects manage runoff at its source to reduce CSOs.

Throughout our planning process, technical advisors and CCMUA staff made us aware of projects underway and planned for Harrison Avenue, Kaighns Avenue and other locations where water and sewer infrastructure was being implemented. We understood that some problem areas in the city were already receiving a lot of attention and investment. This helped us focus on areas with major issues but no clear plan of action, in order to complement Camden's resilience efforts.

DEEP DIVE

DEEP DIVE (APPENDICES)

READ DEEP DIVE

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